LAKEWOOD INSTRUMENTS™
MODEL 1575e

WATER TREATMENT SYSTEM CONDUCTIVITY CONTROLLER

With feed verification

INSTALLATION & OPERATION MANUAL

SERIAL #: _____

Lakewood Instruments

7838 North Faulkner Road, Milwaukee, WI 53224 USA
Phone (800) 228-0839 • Fax (414) 355-3508
h t t p : / / w w w . l a k e w o o d i n s t r u m e n t s . c o m

Lakewood Instruments™ Model 1575e Controller
Quick Installation Sheet

1. Attach the four (4) supplied mounting feet to the back of the controller enclosure either vertically or horizontally. Install the controller on a flat, non-vibrating surface. Do not mount the controller to a steel object that has a large temperature change (side of cooling tower, etc). This can cause water to condense inside the enclosure.

2. Install water meters, chemical pumps, flow checkers, plumbing assemblies and the conductivity sensor (see drawing on back for cooling tower).

3. Wire the flow switch **(use jumper wire for no flow switch)**, conductivity sensor, water meters, flow checkers, and 4-20 mA output/input, if applicable (see drawing on back). Ensure wiring connections are correct or damage may occur.

4. If doing a conduit installation, remove receptacles and wire pumps and bleed valve directly to the terminals. If using a motorized ball valve, wire as per wiring instructions. Refer to the instruction manual for more details.

5. Plug in chemical pumps and bleed valve to controller (unless hardwired as per step #5).

6. Apply power to the 1575e controller, press "**CLR"** twice, press "**7"** System setup, press "**2"** Initialization, press "**2"** Whole controller, press "**1"** Yes. After initialization, press the "**CLR"** key several times until you get to the main menu.

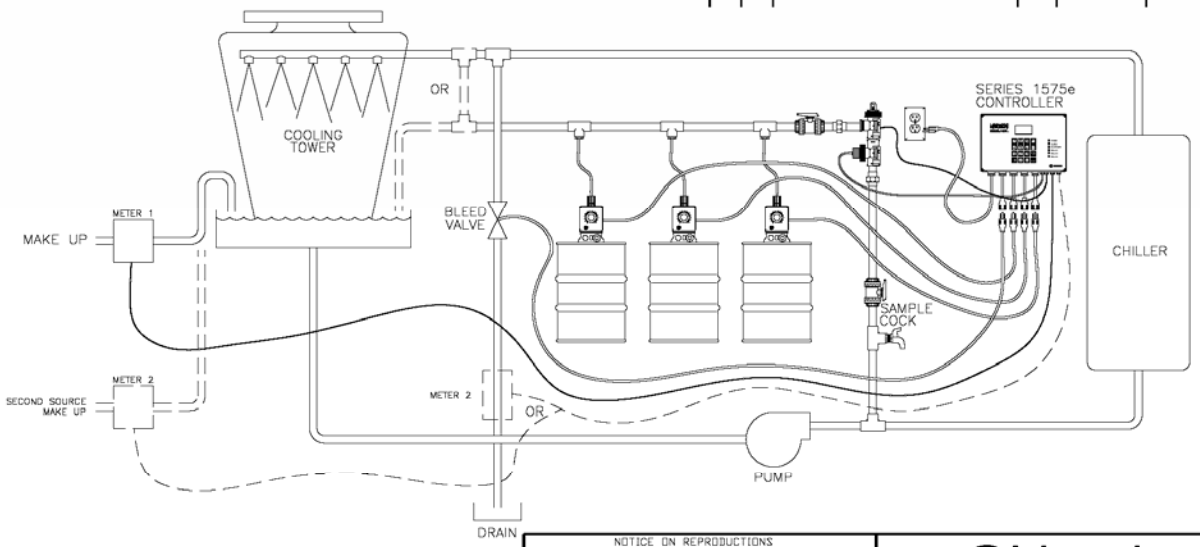
7. Press "1" Process, Press "**ENT"**. This screen allows manual control of the relay outputs to test the chemical pumps and bleed valve. Press "**CLR"** to return to the Process screen.

8. Press "**CLR"** to get to the main menu. Press "**7"** System Setup, press "**1"** Process Parameters, press "**1"** Cell Constant, input the cell constant for your sensor, press "**ENT"** to return to the Process Parameter screen**.** Press "**2"** Temp Compensation, select the temperature compensator for your sensor. Press "**CLR"** several times to return to the main menu, press "**1"** for the Process screen.

9. To calibrate conductivity take a sample with a handheld conductivity meter, press the "**PRO"** button, type in conductivity value, press "**ENT"** (skip if not using conductivity sensor).

10. Set up the digital inputs, water meters, and program the 1575e relays for bleed and chemical feed schemes. If no conductivity sensor is used, disable the conductivity input. See instruction manual for more details.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/8/15/02	



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Lakewood INSTRUMENTS

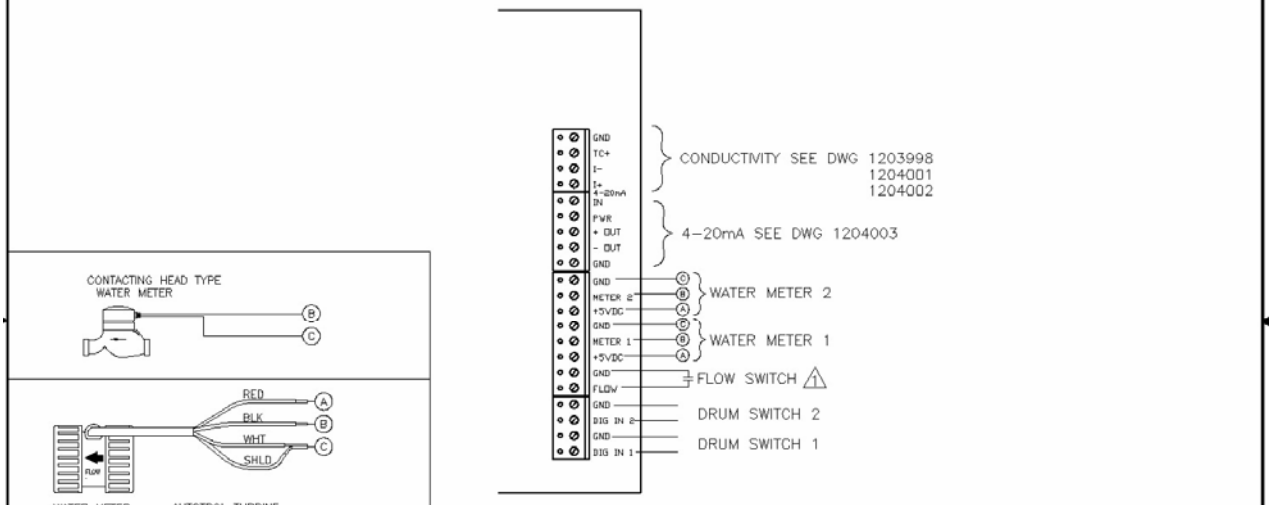
DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

MATERIAL: N/A	TOLERANCES UNLESS NOTED: DECIMALS .X ± .XX ± .XXX ±; ANGLES ±; SURFACE √	TITLE: INSTALLATION DRAWING COOLING TOWER,1575e	
FINISH: N/A	DWN DGK DATE 8/15/02; CHKD DATE	SIZE B; THIRD ANGLE	PN 1229239 REV A
PROJECT: N/A	APVD DATE	SCALE NTS	SHEET 1 OF 1	DWG NO 1229239-1a REV A
LIBRARY: N/A	PART VERSION N/A		

P/N 1229239 REV A

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6977	DGK/23JAN02	

NOTES: UNLESS OTHERWISE SPECIFIED;
1. IF NO FLOW SWITCH IS USED, SHORT OUT PINS 1 & 2 WITH WIRE.



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Lakewood INSTRUMENTS

DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994

MATERIAL: N/A	TOLERANCES UNLESS NOTED: DECIMALS .X ± .XX ± .XXX ±; ANGLES ±; SURFACE √	TITLE: WIRING DIAGRAM FOR WATER METER INPUTS ON THE 1575e	
FINISH: N/A	DWN DGK DATE 23JAN02; CHKD DATE	SIZE B; THIRD ANGLE	PN 1229239 REV A
PROJECT:	APVD DATE	SCALE NTS	SHEET 1 OF 1	DWG NO. 1229239-5a REV A
LIBRARY:	PART VERSION		

IMPORTANT NOTICE

WARNING: CHEMICAL FEED

All electromechanical devices are subject to failure from a variety of causes. These include mechanical stress, component degradation, electromagnetic fields, mishandling, improper setup, physical abuse, chemical abuse, improper installation, improper power feeds, and exposure.

While every precaution is taken to insure proper functioning, extra precautions should be taken to limit the ability of over-feeding by limiting chemical quantities available, secondary shut-downs, alarms, and redundancy or other available methods.

CAUTION: POWER SOURCE AND WIRING

Low voltage wiring and high voltage (110 plus) should not be run in the same conduit. Always run separately. Even shielded low voltage is not a guarantee of isolation.

Every precaution should be taken to insure proper grounding and elimination of shorting or Electromagnetic field (EMF) interference.

WARNING: ELECTRICAL SHOCK

To reduce the risk of electrical shock, this equipment has a grounding-type plug that has a third (grounding) pin. This plug will only fit into a grounding-type outlet. If the plug does not fit into the outlet, contact a qualified electrician to install the proper outlet. ***DO NOT*** change the plug in any way.

Lakewood Instruments

We thank you for your selection and purchase of a Lakewood Instruments product.

With proper care and maintenance, this device should give you many years of trouble-free service. Please take the time to read and understand this Installation and Operation Manual, paying special attention to the sections on **OPERATION** and **MAINTENANCE**.

If, in the future, any parts or repairs are required, we strongly recommend that only original replacement parts be used. Our Customer Service Department is happy to assist you with your parts or service requests.

☎ **Lakewood Instruments Customer Service and Technical Support Departments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. - 5:00 p.m. CST. Our e-mail address is csd@lakewoodinstruments.com**

✉ **Mail should be sent to:**

Lakewood Instruments
7838 North Faulkner Road
Milwaukee, WI 53224 USA

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1.0 Introduction

The Model 1575e is a microprocessor based, menu driven, water treatment controller designed for use in cooling towers, chill loops, boilers and condensate systems. The Model 1575e provides for conductivity tracking and control, flow monitoring and chemical injection. The Model 1575e can be operated with or without the use of the conductivity input. The Model 1575e is NTL/CSA, and CE approved.

The Model 1575e uses the latest in microprocessor capability, giving the user a high level of application flexibility. A large illuminated graphics screen, multiple inputs, and an intuitive menu characterize this new technology. Security features allow full access to programming features or restrict access to viewing only. An operator password can help ensure that only authorized personnel will operate the system.

The Model 1575e is user-friendly with a graphical screen, numeric keypad, LEDs for power, alarm and relay status. It accepts multiple inputs and is easily configured. It's a combination of reliability, accuracy, security and simplicity.

The model 1575e can accept up to two feed verification inputs through its two digital inputs. The model 1575e has been designed to accept these feed verification inputs from the Tacmina FC-1 flow checker.

The controller is able to energize relays 2, 3, or 4 based on the makeup water meter input. The relay can be configured to feed a user specified amount of chemical, measured in milliliters, after receiving a user specified amount of makeup water meter input. This amount of chemical flow would be measured by the Tacmina FC-1. After the specified amount of chemical is measured, the relay de-energizes. The controller has selectable display screens for the two flow checker inputs showing the totalized flow in milliliters, alarms for short cycle and pump timeout, a screen to reset the short cycle alarm, a screen showing the total milliliters fed for the last 1000 gallons of makeup, and a screen that converts the milliliters for the last 1000 gallons of makeup to lbs of chemical for the last 1000 gallons of makeup.

There are two alarms associated with the feed verification feature. The first alarm is a "RELAY TIME EXCEEDED" or overfeed alarm. When used with a flow checker, this alarm will occur if the controller does not register the specified feed counts from the flow checker within a specified amount of time. This alarm turns off the affected relay. The alarm resets when a new feed signal is received from the makeup water meter.

The second alarm is a "Short Cycle" alarm. This alarm will occur if the controller does not complete a feed cycle before the next feed signal is received from the makeup water meter. The controller will function as follows: The controller is in the middle of a chemical feed after receiving an input from the makeup water meter; another input from the makeup water meter is received, the controller will stop its current feed, begin the new feed and activate the alarm. This alarm does not turn off the relay or activate the alarm LED. This alarm will lock in and will be required to be reset by the operator.

2.0 Features, Benefits, Specifications

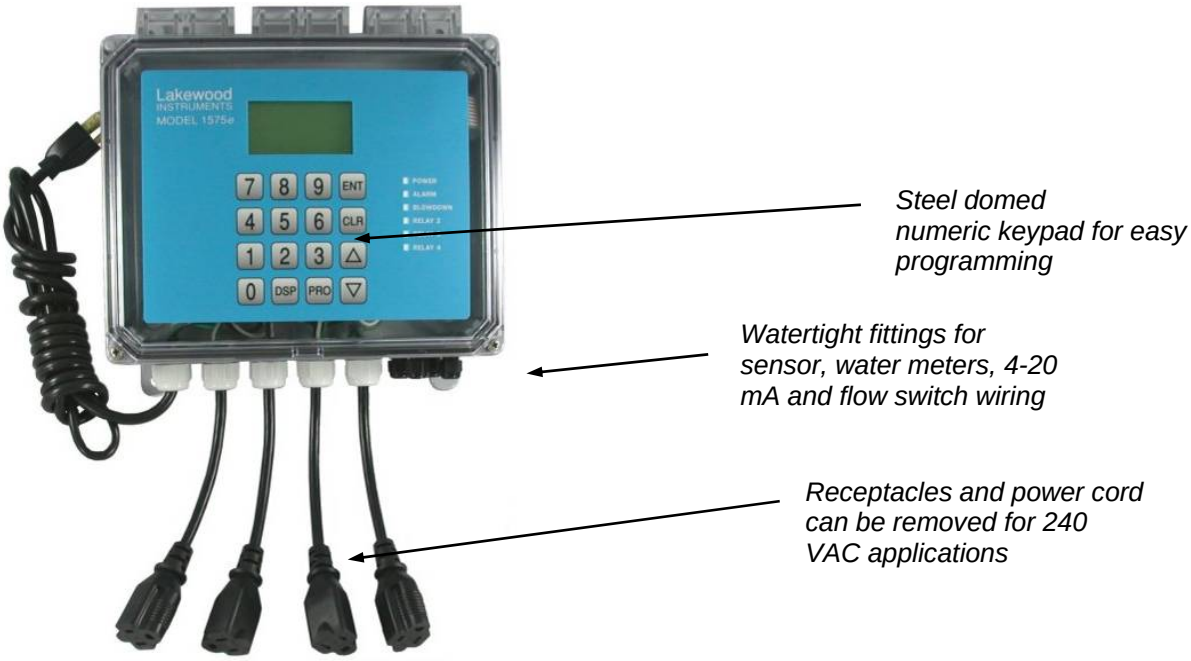

Lakewood
INSTRUMENTS
MODEL 1575e
7 8 9 ENT
4 5 6 CLR
1 2 3 △
0 DSP PRO ▽
Steel domed numeric keypad for easy programming
Watertight fittings for sensor, water meters, 4-20 mA and flow switch wiring
Receptacles and power cord can be removed for 240 VAC applications

Figure 1: *Model 1575e*

2.1 FEATURES

- Controller can be used for Cooling towers, Chill loops, Boilers, and Condensate systems
- Removable power cord and receptacles for conduit installations. Enclosure is rated NEMA 4X
- Four user configurable relays for conductivity control and chemical addition. These relays can be configured in multiple ways including scheduled feed for biocide addition
- Two (2) water meter inputs, two drum switch or flow checker inputs, conductivity input, flow switch input, 4-20 mA output, and an optional remote conductivity input via 4-20 mA are all standard features.
- Designed with a single circuit board for high reliability and lower cost.
- Large open shallow enclosure for easy wiring.
- Ball valve delay feature allows accurate control of motorized ball valves.
- Heavy-duty stainless steel domed numeric keypad and illuminated graphical display allow for quick and easy programming. Steel domed switches improve the tactile sensing and life expectancy of the keypad.
- The Model 1575e controller stores all setpoints, calibration values, and relay configurations in an EEPROM. An EEPROM does not require a battery to retain information, so if power is lost these values will be retained for years. The 1575e includes a capacitive backup device to retain information such as water meter totals, and clock and calendar information. The capacitive backup device will never need to be replaced and will hold data approximately 1 day after each power failure.

2.2 BENEFITS

- Easy to program, the Model 1575e Controller uses an intuitive menu and programs identical to the Lakewood 2000 Series controllers.
- Controller can be removed from a cooling tower and be placed in another type of application when used with the appropriate conductivity sensor and plumbing assembly.
- No add-on options. 4-20mA output, 4-20mA input, and biocide features are standard.

2.3 Specifications

Conductivity range
50-10,000 µS for Cooling Towers; 500-8000 µS for Boilers; 10-100 µS for condensate.

Conductivity sensor
2 electrode

Conductivity Resolution
± 10 µS (conductivity < 5000 µS)
± 100 µS (conductivity > 5000 µS)

Temperature comp.
Automatic (except boiler sensors)

Accuracy & repeatability
± 1.0% of scale

Deadband/Setpoint
User programmable

Auto/Manual outputs
Menu selectable

Keypad
16 tactile steel-dome push buttons

Display
Illuminated 128 x 64 pixel LCD

Water meter inputs (2)
Contact head, paddle wheel or turbine

Digital Inputs
2 digital inputs for drum switches or flow checkers

Timer
Max. blowdown time exceeded.
Relay run time exceeded .

Input Signal
One 4-20 mA, non-isolated, internally powered Input.

Output Signal
One 4 – 20 mA, isolated or non-isolated optionally powered output for conductivity.

Output relays
3 selectable use, 1 blowdown

Relay ratings
3A each, 10A total

Power
120/240 VAC 50/60 Hz 6W

Ambient temp
32° - 140°F (0 - 60°C)

Storage temp
-4° - 150°F (0 - 60°C)

Sensors/Plumbing	Cooling Tower	Boiler	Condensate
Max Pressure	140 psi (9.65 bar) @100°F	600 psi (41.3 bar)	70 psi (4.8 bar)
Max Temp	140°F (60°C)	486°F (252°C)	392°F (200°C)
Min flow	1 gpm (3.785 Lpm), 5 gpm max	Varies w/orifice plate	1 gpm (3.785 Lpm)

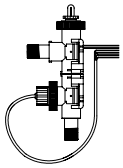
***Figure 2: Model** 1575e Enclosure*

2.4 Ordering Information

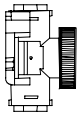
CONTROLLER OPTIONS

1575e Water Treatment Controller. Universal controller is field programmable for cooling towers, boilers, and condensate applications.

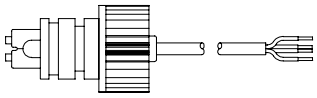
COOLING TOWER OPTIONS



Cooling Tower Flow Switch Plumbing w/ Sensor



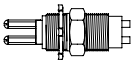
Cooling Tower Sensor Tee



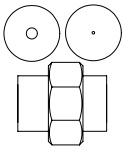
Conductivity sensor

1167158 Cooling Tower Sensor with 20 ft of cable
1167214 Plumbing Tee
1107003 Flow Switch Plumbing.

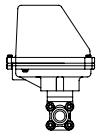
BOILER SYSTEM OPTIONS



SR2



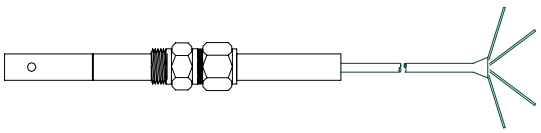
ORIFICE UNION



MBV1

1168374 SR2 Boiler water sensor with 20 ft cable and elbow. ¾ in NPT connection.
1166355 Orifice Plate, ½ NPT, $^{1}/_{16}$.
1166356 Orifice Plate, ½ NPT, ¼.
116635 Orifice Plate, ½ NPT, $^{1}/_{8}$.
1167972 Orifice Plate, ½ NPT, $^{3}/_{8}$.
1167244 Orifice Union, ½ NPT.
1166686 MBV1 ½ in NPT Motorized ball valve.
1166687 MBV2 ¾ in NPT Motorized ball valve.

CONDENSATE OPTIONS



540K.1-4-10I-10-TC500

1104591 540K.1-4-10I-10-TC500 Condensate sensor with ¾ in NPT inline fitting. 0-100 µS.
1168617 540K.1-4-10R-18-TC500 Condensate sensor with 1.0 in NPT retractable inline fitting. 0-100 µS.
1104592 540K.01-4-10I-10-TC500 Condensate sensor with ¾ in NPT inline fitting. 0-10 µS.
1169642 540K.01-4-10R-18-TC500 Condensate sensor with 1.0 NPT retractable inline fitting. 0-10 µS.

3.0 Unpacking, Mounting and Installation

3.1 Unpacking

Inspect the shipping carton for obvious external damage. Note on the carrier's bill-of-lading the extent of the damage, if any, and ***notify the carrier***. Save the shipping carton until your Model 1575e controller is started up.

☎ **If shipping damage has occurred, call the Lakewood Instruments Customer Service Department at (800) 228-0839 and return the controller to the factory in the original carton.**

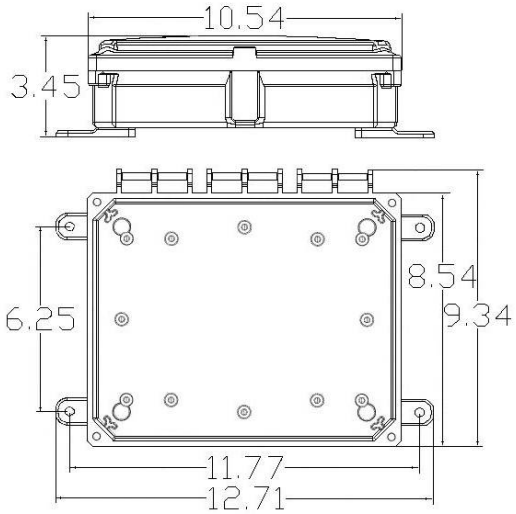
3.2 Mounting the Enclosure

The Model 1575e is supplied with four mounting feet. The Model 1575e can be mounted to a panel or to a flat non-vibrating wall.

- Attach the four mounting feet to the back of the controller enclosure.
- Install on smooth surface to prevent stress on the mounting feet.
- Do not install on vibrating wall.
- If enclosure is installed in corrosive environments, consider purging.
- Dimensions indicated as inches (millimeters).
- The enclosure material is PVC.
- Use #10 mounting screws (4).

Avoid drilling or punching additional holes in the controller enclosure. Damage incurred as a result of any alteration to the enclosure is not covered under the Lakewood Instruments product warranty.

The dimensions of the enclosure in inches are:



The model 1575e has a shipping weight of less than 5 lbs.

3.3 Plumbing Installation

3.3.1 Cooling Tower Plumbing

PLUMBING MATERIALS

- Inlet plumbing can be ¾ inch (1.9 cm) PVC, CPVC, or iron pipe.
- Provide at least 1 gpm (3.79 Lpm) to the sensor. A 4-psi (0.3 bar) differential pressure from take-off to injection is sufficient. If flow is marginal, consult your Lakewood Instruments Factory Representative. The maximum recommended flow is 5 gpm (18.93Lpm).
- Outlet plumbing can be ¾ inch (1.9 cm) PVC, CPVC, or iron pipe. PVC, CPVC Schedule 80 is recommended for strength and sunlight protection.
- If iron pipe is used, install a PVC union to relieve the stress on the plumbing.
- The sample line inlet should be plumbed downstream of the recirculating pump and upstream of the heat exchanger. This line brings the sample water into the sensor plumbing for conductivity measurement. If the Lakewood Instruments flow switch plumbing assembly is used, this flow of water also pushes the flow switch float up to activate the relay outputs of the controller.

NOTE: FOR YOUR CONVENIENCE, INCLUDE A LAKEWOOD INSTRUMENTS MODEL 9102 SAMPLE LINE SHUT-OFF VALVE AND A SAMPLE VALVE SPOUT (AS SHOWN) IN THE INLET FLOW PLUMBING.

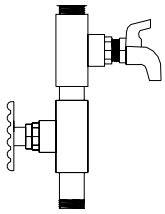


Figure 3:

Model 9102 Valve & Spout

- The sample line outlet flow (solution/sample line) should be plumbed to the tower return line or the tower basin, where you can insert your chemical feed system. Refer to the suggested installation drawing in the back of this manual for an example of a typical installation.
- Remember to install isolation and bypass valves so that maintenance can be performed.

WARNING: NEVER INJECT CHEMICALS UPSTREAM OF THE CONTROLLER FLOW CELLS!

☎ **If you have questions or need assistance, call Lakewood Instruments Technical Service Department at (800) 228-0839, Monday-Friday, 7:30 a.m. - 5:00 p.m. CST.**

WARNING: SOME CHEMICALS MAY HAVE TO BE INJECTED DIRECTLY INTO THE COOLING SYSTEM WATER LINE AND NOT INTO THE SAMPLE LINE. CONTACT YOUR WATER TREATMENT SPECIALIST FOR SPECIFIC RECOMMENDATIONS.

NOTE: IF THE SOLUTION/SAMPLE LINE IS RETURNED TO THE COOLING TOWER RETURN LINE, USE A CORPORATION STOP (LAKEWOOD INSTRUMENTS MODEL 9160), A SOLUTION LINE INJECTOR OR A DISPERSING PIPE. THIS AIDS CHEMICAL-WATER MIXING AND ENHANCES WATER TREATMENT CONTROL CAPABILITIES.

3.3.1.1 Blowdown Valve Sizing

If you have a way to measure your blowdown flow rate and pressure range, you can use the chart below to determine the correct valve size. If not, consult your water treatment engineer.

Adjustable flow rate diaphragm valves require at least 10-psi (0.7 bar) differential pressure to close. If your water pressure is marginal, use a supply water pressure actuated diaphragm valve or a valve designed to work with zero differential pressure.

Extremely dirty cooling water will plug diaphragm valves. In such cases, use a motorized ball valve and a globe valve for flow control. A strainer ahead of the valve may be okay, but you must flush it regularly. If your flow lines are above 3 inch (for large systems), use a pneumatically operated butterfly valve.

- Be sure to provide isolation and bypass valves. Refer to drawings in the back of the manual for examples of typical installations. If your blowdown valve ever fails, you need to be able to bypass it in order to service it.

BLOWDOWN VALVE SIZING CHART

Pressure range		Flow range		Suggested Valve Size	
(psi)	**(bar)**	**(gpm)**	**(Lpm)**	**(inch)**	**(cm)**
10-50	0.7-3.4	1-5	3.8-18.9	¾ inch	1.9 cm
50-150	3.4-10.3	5-10	18.9-37.9	¾ inch	1.9 cm
10-50	0.7-3.4	5-10	18.9-37.9	1 inch	2.5 cm
50-150	3.4-10.3	10-15	37.9-56.8	1 inch	2.5 cm
10-50	0.7-3.4	10-15	37.9-56.8	1½ inch	3.8 cm
50-150	3.4-10.3	15-20	56.8-75.7	1½ inch	3.8 cm
10-50	0.7-3.4	15-20	56.8-75.7	2 inch	5.1 cm
50-150	3.4-10.3	20-30	75.7-113.6	2 inch	5.1 cm
10-50	0.7-3.4	30-100	113.6-378.5	3 inch	7.6 cm
10-50	0.7-3.4	100-300	378.5-1135.5	4 inch	10.2 cm

3.3.2 Boiler Plumbing

PLUMBING INSTALLATION

There are two methods of automatic control of the conductivity in a boiler; sample/cycle and continuous sample. To decide if you should use continuous sample or sample/cycle control, determine your blowdown rate requirement. If your boiler requires greater than 1000 pounds per hour of blowdown to maintain conductivity then the continuous sample method should be used. If your blowdown requirement is less than 1000 pounds per hour, the sample/cycle method is appropriate.

The model 1575e can be used for either sample/cycle control or continuous sample control of the conductivity in the boiler. The installation drawing in the back of this manual shows how to plumb the boiler sample line so that it can be used as sample/cycle or continuous sample.

To prevent steam flashing and damage to the controller refer to the installation drawing in the back of the manual and notes below.

- Use piping from the boiler skimmer line as the sample and blowdown line.

NOTE: DO NOT USE THE BOTTOM BLOWDOWN OUTLET AS THE SAMPLE OR AUTOMATIC BLOWDOWN LINE.

- The maximum allowed wire distance between the controller and the sensor is 20 ft unless the 4-20 mA input is used.

- If using conduit between the sensor and controller, allow a place for water to escape if the sensor leaks. This will help prevent water damage to the controller.

- Use orifice plates or globe valves to prevent steam flash. The orifice plates or the globe valve should be mounted within 5 feet of the sensor. Orifice plates (or globe valve) and the sensor must be installed horizontally (as shown in the drawing).

- The sensor should be located at least two feet **below** the water level in the boiler.

- Ensure that there are no restrictions between the skimmer line and the orifice plates (or globe valve) and all valves upstream of the boiler sensor are fully open.

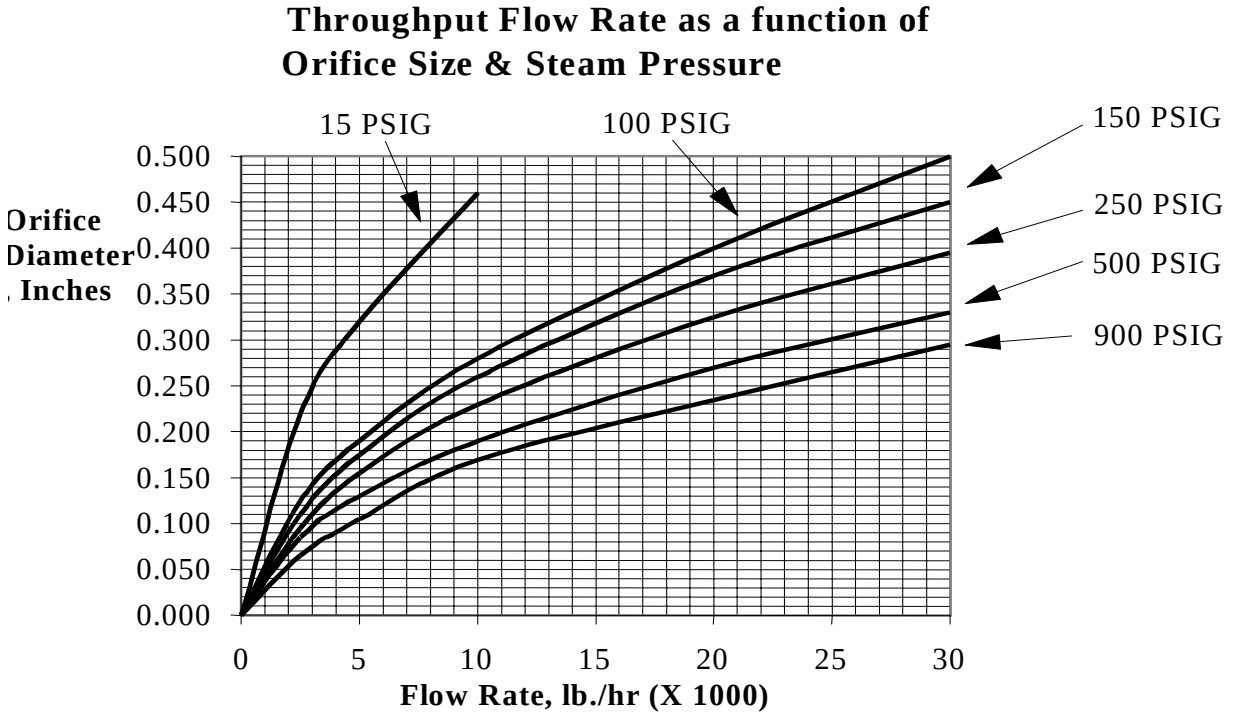
- Be sure to provide isolation valves in the sample line to allow for maintenance of the sensor.

- Refer to section 3.3.2.1 for the orifice sizing chart

NOTE: DO NOT RUN THE SENSOR WIRING IN THE SAME CONDUIT AS THE MOTORIZED VALVE WIRING.

3.3.2.1 Orifice Sizing Chart

Refer to the chart below to determine the orifice size that is required for a specific flow rate.



3.3.3 Condensate Plumbing

Lakewood Instruments recommends that the conductivity sensor be mounted per the drawing in the back of this manual. The sensor is mounted vertically to remove any air bubbles, which may otherwise collect around the sensor tip. Avoid connections in “dead leg” sections of pipe. An air pocket around the electrode tips will cause erroneous readings. The sensor electrodes should be in direct contact with the process flow.

3.3.4 Sensor Mounting

The conductivity sensor should be mounted in the horizontal position (except for the condensate sensor). When using the plumbing with the Flow Switch, be sure that the dome is in the upright position. Avoid connections in “dead leg” sections of pipe. An air pocket around the electrode tips will cause erroneous readings. The sensor electrodes should be in direct contact with the process flow. The water flow should be in the upward direction for cooling tower sensor and the condensate sensor. The flow should be in the downward direction for the boiler sensor.

3.4 Electrical Installation

3.4.1 Incoming Power 115/230 VAC

The Model 1575e can be powered from either 115 VAC or 230 VAC at 50/60 Hz. There is a power selector switch located in the upper left-hand corner of the control board. To select the appropriate voltage, simply slide the switch from one position to the other with a small screwdriver.

The Model 1575e controller comes with a power cord and female molded receptacles for the blowdown valve and chemical pumps. The power cord and receptacles are rated for 115VAC. If the controller will be powered by 230 VAC, the power cord and receptacles will need to be removed and the incoming power and the relay outputs will need to be hard-wired.

The incoming power is connected to terminal block P1 at the bottom left corner of the control board. There is a hot or line input (L1), a neutral input (N) and an earth ground input (⏚). Refer to the drawing in the back of this manual for wiring instructions.

3.4.2 Relay Outputs

The relay outputs are of the same voltage as the power input. Ensure that the devices that are to be connected to the relay outputs are of the same voltage rating or damage will occur.

The relay outputs are wired to the female molded receptacles. The molded receptacle on the far left is relay #1 and the molded receptacle on the far right is relay #4. If 115 VAC is used simply plug your devices into the molded receptacles. If 230 VAC is used, remove the receptacles and hard-wire your devices to the relay outputs.

Relay #1 has both a normally open and normally closed contact. This is designed for used with a motorized blowdown valve. The normally open (NO) contact is connected to the open connection of the valve and the normally closed (NC) contact is connected to the close connection of the valve. The other three relays only have a normally open contact. Each relay output has a neutral (N) connection and an earth ground connection (⏚**)** connection.

To operate the terminal blocks to remove or add wiring, insert a small screwdriver into the slot above each wiring connection and pry upward while removing or inserting the wire.

Refer to the drawing in the back of this manual for wiring instructions.

3.4.3 Flow Switch Wiring

The model 1575e has a flow switch input. The purpose of the flow switch input is to disable the relay outputs on a loss of flow in the system. The flow switch input requires a digital contact. Any digital contact rated for 24 VDC and 500 mA may be used, such as a relay driven by the recirculating pump. Lakewood Instruments manufactures a flow switch plumbing assembly for use with the model 1575e.

If a flow switch is not used then a jumper must be installed across the flow switch connections. Refer to the drawings in the back of this manual for wiring instructions.

3.4.4 Sensor Wiring

The model 1575e uses the Lakewood Instruments two electrode conductivity sensors. These sensors can be wired directly or a 4-20 mA device can amplify them. The maximum recommended wiring distance for sensors without a 4-20 mA device to amplify them is 20 feet.

Direct wired sensors are wired directly to the P8 terminal block on the upper right corner of the control board. Refer to the drawing in the back of this manual for wiring instructions for each of the available Lakewood Instruments conductivity sensors.

Sensors that are amplified by a 4-20 mA device are wired to terminal block P2. The model 1575e controller powers this 4-20 mA device. Refer to the drawing in the back of this manual for wiring instructions for the 4-20 mA input.

3.4.5 Water Meter Wiring

The Model 1575e will accept two water meter inputs. These inputs can be configured for make-up, make-up Second Source, Bleed, or Chill Loop make-up. Refer to the water meter manufacturer's manual for plumbing information.

The 1575e series controllers will work directly with the following types of meters: dry contacting head meters, Seametrics open collector output meters, Signet 2535 and 2540 paddle wheel meters, and the Autotrol 1 inch and 2 inch meters. Contact Lakewood Instruments for other types of water meters. The water meters are wired to terminal block P7 on the right-hand side of the control board. Refer to the drawing in the back of this manual for wiring instructions.

3.4.6 Digital Inputs Wiring

The model 1575e has two digital inputs to be used as either drum switch inputs or as flow checker inputs. The digital inputs are wired to terminal block P5. Terminals 1 and 2 are used for digital input #1, and terminals 3 and 4 are used for digital input #2.

When used as a drum switch input, the digital inputs require a dry contact input. Any digital contact rated for 24 VDC and 500 mA may be used. The inputs are not polarity sensitive; either of the two wires can be connected to either of the two input terminals.

When the digital inputs are used as a flow checker input, the wiring diagram in the back of this manual must be followed or damage may occur. The Tacmina FC-1 flow checker uses the +5 vdc output from the water meter input terminal block P7, terminal #3 or terminal #6. The other two wires of the flow checker are wired to the desired digital input terminals.

If it is desired to use a flow measuring device other than the Tacmina FC-1, please contact Technical Support for additional information.

Refer to the drawing in the back of this manual for wiring instructions.

3.4.7 4-20 mA Output Wiring

The model 1575e has one 4-20 mA output for conductivity. This output can be isolated or non-isolated, externally powered or internally powered. If the 4-20 mA output is internally powered then it is non-isolated. If the 4-20 mA output is externally powered then it is isolated.

The 4-20 mA output is wired to terminal block P2 on the right-hand side of the control board. Refer to the drawing in the back of this manual for wiring instructions.

3.4.8 4-20 mA Input Wiring

The model 1575e can accept a 4-20 mA input as the conductivity input. The conductivity sensor is wired to a 4-20 device and the device is wired to terminal block P2 on the right-hand side of the control board. This input is a non-isolated input and the controller powers it. Refer to the manufacturer instructions for wiring of the 4-20 mA device.

A Lakewood Instruments 100 series conductivity controller with a 4-20 mA output works very well as the 4-20 mA input device for M1575e conductivity.

Refer to the drawing in the back of this manual for wiring instructions.

4.0 Functional Overview

4.1 Front Panel

Figure 4: *Model 1575e Front Panel with Display*

LCD
A large, 128x64-pixel graphic display makes it easy to read the menu-driven program

ENCLOSURE
A sturdy NEMA 4X enclosure protects your controller. Make sure it is properly mounted on a flat, non-vibrating wall.

16-BUTTON KEYPAD
ENT = for Menu selection and/or acceptance of selected values.
CLR = to exit a Menu selection and/or skip input options.
PRO = to program a Menu selection.
DSP = Not used.

INDICATOR LIGHTS
LEDs for Power, Alarm, and relay status

4.2 Display

The model 1575e uses an illuminated 128x64-pixel LCD digital display for ease of viewing. It has multiple lines to display information such as the conductivity reading, alarms, relay status, relay configuration, clock, flow rates and total flow for both water meters, and menu selections.

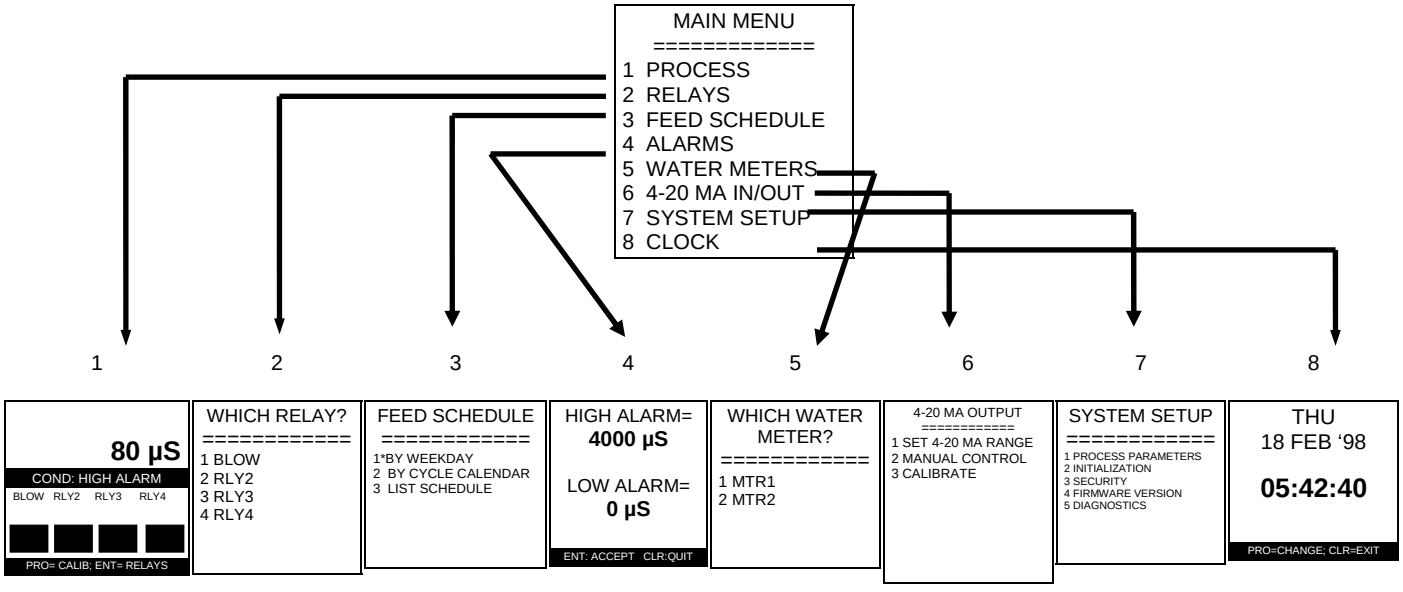
4.3 Keypad

The model 1575e uses a 16-key steel-domed numeric keypad for ease of programming. The keys have the following functions:

ENT	To accept a setting or to enter a screen.
CLR	To exit a screen or to access the main menu.
PRO	To calibrate the controller.
DSP	Not used.
UP arrow	To move about in the menu.
DOWN arrow	To move about in a menu.
Number keys	To input a value or to select a menu item.

4.4 Menu

The model 1575e is programmed and calibrated by the use of a menu. The complete **Main Menu** has 8 available options that can be accessed in the **Technician Level**. However, a list of only six options can be viewed at one time. Use the ↑ and ↓ keys to scroll through the options. As an introduction, here is a graphic overview of the first level of each option in the **Main Menu** to see how it operates. Complete details of each option are provided later in this manual.



4.5 Security Levels

The model 1575e has a security feature to lock out the menu to prevent tampering of the controller.

In normal operation the controller is in the TECHNICIAN security level. This level allows the user full access to the entire menu.

To prevent tampering of the controller, the model 1575e can be placed into the View Only security level. When the controller is in the View Only security level, the menu is completely locked out; access is limited to manual operation of the relays, and viewing all of the process screens.

A password is required to change from the VIEW ONLY security level to the TECHNICIAN security level. If the controller is in the View Only security level just press the password on the keypad to change to the TECHNICIAN security level.

The TECHNICIAN security level password is factory-preset to **2222**. This password can be changed to a different 4-digit password in the main menu.

5.0 Starting Up the Controller

Once the hardware Installation is complete it is time to start up the controller.

Note: If a flow switch is not used, the flow switch input must be bypassed by installing a jumper wire across terminals 1 & 2 of terminal block P7 or else the relays will not be able to be energized by the program.

1. Initiate sample flow to the sensor by opening the sample line isolation valves. Check for leakage.

2. Power up the controller by either turning on the circuit breaker or plugging the power cord into a 120 VAC receptacle.

3. It is best to initialize the whole controller to remove any settings that may be in the memory before programming the controller. Refer to section 6.5.7.1 of this manual to initialize the controller.

4. If conductivity will not be used with this controller, disable the conductivity input. Refer to section 6.5.7.1.4 of this manual.

5. If the conductivity input will be coming from a 4-20 mA device enable the 4-20 mA input by following section 6.5.6.2.

6. If conductivity is used and it is not coming from a 4-20 mA device set up the cell constant and temperature compensation for the sensor. Follow sections 6.5.7.1.1 and section 6.1.7.1.2 respectively.

7. If flow checkers or drum switches are to be used set up the digital inputs by following section 6.5.7.5.

8. If this controller will be used in a boiler application, enable the anti-flashing in section 6.5.7.1.3.

9. Set the clock by following section 6.5.8.

10. Set the high and low conductivity alarms by following section 6.5.4.

11. Set up the water meter inputs by following section 6.5.5.

11. Configure the relays for operation by following section 6.5.

12. Calibrate the conductivity by following section 6.3

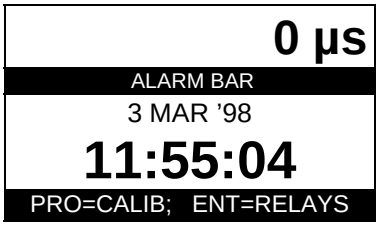
13. Verify operation of the controller before leaving the area.

6.0 Operation of the Controller

6.1 Process Screen

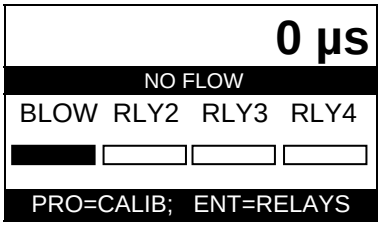
The screen that is used the most in the 1575e controller is the Process Screen. Below are the process screen views. The process screen has three sections. The top section shows the conductivity reading. The alarm bar is the middle section and appears between the top and bottom sections. It is solid in appearance and flashes showing the current active alarms in sequence if there are multiple alarms. The bottom section has user selectable readings as shown below.

1 - DATE SCREEN

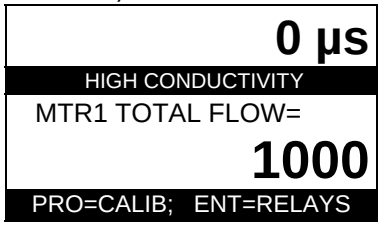


- There are many different screens available in the **PROCESS** screen. These screens allow you to view the units settings (incl. time setting, relay set-ups, flow rates, total flow, etc.) without the danger of altering them. Access these screens by using the ↑ and ↓ keys to scroll through the available screens.
- Press "**ENT"** to manually enable a relay for testing or troubleshooting purposes.
- Press "**PRO**" to calibrate the conductivity.

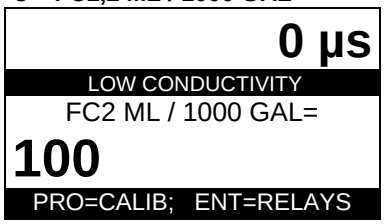
2 - ALL RELAY SCREEN



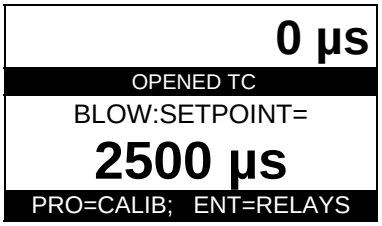
5 - MTR1,2 FLOW



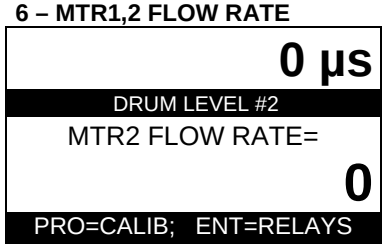
8 – FC1,2 ML / 1000 GAL



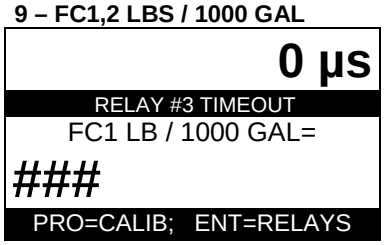
3 - BLOW SETPOINT SCREEN



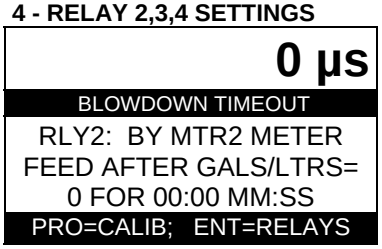
6 – MTR1,2 FLOW RATE



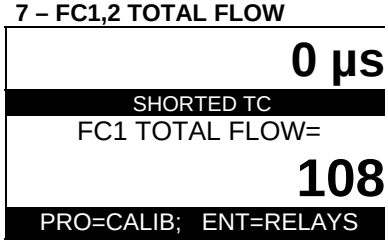
9 – FC1,2 LBS / 1000 GAL



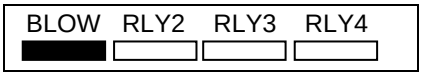
4 - RELAY 2,3,4 SETTINGS



7 – FC1,2 TOTAL FLOW



When conductivity is disabled the top half of the screen will look like this.



The bottom half of the display is user selectable and may be left in any screen desired.

DATE AND TIME is the current date and time.

ALL RELAY shows the current status of all four relays. The box is clear to show that the relay is off and darkened to show the relay is on.

BLOW SETPOINT shows the current blowdown setpoint. When the blowdown relay is used for SAMPLE / CYCLE control in a boiler application, this screen will show one of three possible displays; SAMPLING, CYCLING, or the SETPOINT. In the SAMPLING and CYCLING screens a count down timer is displayed to show the current status of the blowdown relay.

RLY 2,3,4 SETTINGS shows the current configuration of relays 2, 3, and 4. This allows the operator to check the relay settings without the possibility of accidentally making changes.

MTR1,2 TOTAL FLOW is the total amount of flow through the applicable water meter since the total was reset. This total is updated each time a count is received.

MTR1,2 FLOW RATE is the current flow rate through the applicable water meter. A contact head water meter will not display a flow rate.

FC1 or **FC2 TOTAL FLOW** is the total amount of flow through the applicable flow checker since the total was reset. This total is updated each time a count is received.

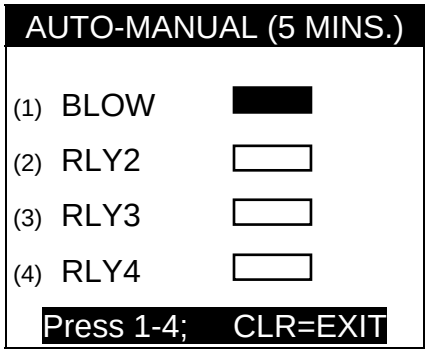
FC1 or **FC2 ML/1000GAL** is the amount of chemical fed during the last 1000 gallons of flow through the applicable water meter. If <1000 gallons have flowed, ### will be displayed. This total is updated after every 100 gallons of flow through the water meter.

FC1 or **FC2 LB/1000 GAL** is the total flow through the applicable flow checker during the last 1000 gallons of flow through the applicable water meter **times** the constant to convert milliliters to pounds. This total is updated after every 100 gallons of flow through the water meter.

6.2 Manual Operation of the Relays

All four of the relays can be operated manually. To manually operate the relays:

Go to the **Process** screen. Press "**ENT**". You will be taken to a screen that looks like:



Press "1-4 " to manually change the state of that particular relay. If the relay is already on, pressing that number will turn it off. A five-minute countdown timer will start. After five minutes has expired the relay will return to automatic control. A relay that is in manual control will stay in manual control until the five minutes expires even if this screen is exited. The five-minute timer helps to prevent damage to the system if a relay is left in manual. **WARNING: Manual control overrides everything including the flow switch input. Use care when operating relays manually with no flow in the system.**

6.3 Calibration of Conductivity

The conductivity requires periodic calibration. Calibration is usually required after cleaning the sensor.

Calibration should always be performed with the sensor in the piping assembly with good flow past the sensor. It is necessary to have an accurate reading of the blowdown water to properly calibrate the controller. A hand-held conductivity meter that tests the sample works well for this purpose. If a meter that measures ppm is used, refer to the conductivity vs. ppm chart in section 6.3.1 and convert the ppm to an approximate conductivity value.

If the conductivity sensor is connected to a 4-20 mA device, follow the manufacturer instructions for calibrating that device.

If the conductivity sensor is directly wired to the 1575e controller follow these instructions for calibration.

For cooling towers, condensate and continuous sample boilers

- Ensure that the controller is operating with good flow past the sensor.
- Take a sample of the water and measure with a hand-held conductivity tester.
- From the **PROCESS** screen, press "**PRO**" to enter the calibration screen. Use the keypad to input the conductivity reading from the hand-held. Press "**ENT**".
- Take another hand-held sample to verify calibration.

For sample/cycle boilers

- Manually energize the blowdown relay. Allow the water to flow past the sensor for a minimum of 60 seconds.
- Take a sample of the water and measure with a hand-held conductivity tester.
- From the **PROCESS** screen, press "**PRO**" to enter the calibration screen. Use the keypad to input the conductivity reading from the hand-held. Press "**ENT**".
- Take another hand-held sample to verify calibration.
- Restore the blowdown relay to automatic control.

6.3.1 Conductivity vs. ppm

The model 1575e measures the conductivity of the water. The ppm of the water may be measured instead of conductivity. If ppm is measured, use the following chart for an approximation of the conductivity level and calibrate to the conductivity level that is closest to the ppm level that is measured. Remember this is just an approximation because the ions that make up the conductivity may be different than the particles that make up the ppm reading.

Conductivity vs. PPM Table

µS/cm	ppm	µS/cm	ppm	µS/cm	ppm
2	1	120	68	900	560
4	2.1	140	80	950	600
6	3.2	160	91	1000	630
8	4.2	180	100	1500	970
10	5.2	200	115	2000	1300
12	6.4	220	127	2500	1700
14	7.4	240	139	3000	2000
16	8.5	260	150	3400	2400
18	9.6	280	164	4000	2750
20	11.0	300	176	4500	3150
25	13.5	350	210	5000	3500
30	16.0	400	240	5500	3900
35	19.0	450	270	6000	4300
40	22.0	500	300	6500	4700
45	24.5	550	335	7000	5000
50	27.5	600	370	7500	5400
60	33.0	650	400	8000	5800
70	39.0	700	435	8500	6200
80	45.0	750	470	9000	6600
90	51.0	800	500	9500	7000
100	56.0	850	530	10,000	7400

6.4 Main Menu

The **MAIN MENU** of the 1575e looks like this:

```
MAIN MENU
==========
1 PROCESS
2 RELAYS
3 FEED SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA IN/OUT
7 SYSTEM SETUP
8 CLOCK
```

The **MAIN MENU** can be accessed from the **PROCESS** screen by pressing "**CLR**"**.** If "**CLR**" is pressed and the **MAIN MENU** does not appear, the controller is probably in the **VIEW ONLY** security mode. If the controller is in the **VIEW ONLY** security mode, enter the **TECHNICIAN** security password to be able to access the **MAIN MENU**.

To move about in the menu screen use the ↑ and ↓ keys to highlight the desired option and press "**ENT**" or simply press the number key for the desired option.

Use the "**ENT**" key to accept a setting or to enter a screen. Use the "**CLR**" key to reject a setting or to exit a screen. From anywhere in the menu, pressing "**CLR**" will take you one step closer to the **MAIN MENU**.

Each of the MAIN MENU options are discussed in detail later in this manual.

6.5 Configuring the Relays

To access the relay configuration screen from the **MAIN MENU,** press "**2**" or highlight **RELAYS** and press "**ENT**". The following screen will appear.

```
WHICH RELAY?
============
1 BLOW
2 RLY2
3 RLY3
4 RLY4
```

Select the relay that you want to program.

6.5.1 Configuring the Blowdown Relay

The blowdown relay can be configured to operate based on a setpoint or based on a water meter input. When the blowdown relay is selected for programming the following screen will appear.

```
BLOWDOWN RELAY
============
1 BASED ON SETPOINT
2 BASED ON VOLUME
```

Blowdown can be configured based on a setpoint or based on volume.

6.5.1.1 Based On Setpoint

To set up the blowdown relay to operate based on a setpoint, select based on setpoint. The following screen will appear.

```
BASED ON SETPOINT
============
1 SETPOINT VALUES
2 WHEN TO BLOWDOWN
3 BOILER TIMERS
4 BALL VALVE DELAY
```

SETPOINT
In the **SETPOINT VALUES** screen you will set the **SETPOINT**, the **DEADBAND** and the **EXCESS BLOWDOWN TIME** alarm.

The **SETPOINT** is the conductivity value that you are trying to maintain. Check with your water treatment engineer to determine the conductivity setpoint for your system needs.

Follow these instructions to establish the controller's setpoint:

- Press "**1**" or highlight **SETPOINT VALUES** and press "**ENT**"**.**
- Use the keypad numbers to enter the proper conductivity setpoint and press "**ENT**". When finished, you will automatically be moved down to the deadband.

DEADBAND
After the setpoint is established, the controller's deadband must also be set. "**Deadband**" refers to the amount of conductivity above and below the setpoint—a range within which the controller will not react. Due to continuous fluctuations in the conductivity level, it is necessary to have this deadband range or stable readings will be difficult to obtain. The Deadband should be a small percentage of the setpoint. Half the deadband amount will be automatically put above the setpoint, and the other half below it.

For example, a conductivity setpoint of 1,000 μS with a deadband of 100 μS would result in the BLOWDOWN relay opening at 1,050 μS and closing at 950 μS.

- Use the keypad numbers to enter the proper deadband setpoint and press "**ENT**". When finished, you will automatically be switched to the **EXCESS BLOWDOWN TIME** alarm screen.

EXCESS BLOWDOWN TIME
The **EXCESS BLOWDOWN TIME** alarm is designed to notify the operator of a problem in the blowdown system such as, a clogged strainer or the blowdown valve did not open. The blowdown timeout function is strictly a visual alarm feature displayed on the 1575e series controller–**it will not close the blowdown valve**. If a relay is configured as an alarm relay, the **EXCESS BLOWDOWN TIME** alarm will energize the alarm relay. To disable this function, simply program 0 hours, 0 minutes.

- Use the keypad numbers to enter the time in hours and minutes before this alarm will appear and press "**ENT**".

WHEN TO BLOWDOWN
Most applications for cooling towers and boilers will blowdown *above* the setpoint. There are some chill loop systems, however, where a reverse setpoint method is preferred. That is, blowdown occurs *below* the setpoint. In these applications the user will apply a chemical pump to the bleed outlet and feed a chemical to raise the conductivity of a chiller loop. If using this method be sure that the high conductivity alarm is set as high as possible.

- In the **WHEN TO BLOWDOWN** screen, select either "**1**" **ABOVE SETPOINT** or "**2**" **BELOW SETPOINT**.

BOILER TIMERS
For cooling tower, condensate and continuous sample boiler applications, these timers must remain at zero. In boiler applications where the sample/cycle method is used, times will be entered. A typical sample time is 2 minutes with a cycle time of 1 hour. A short sample time is desired to prevent excessive loss of water and heat. Once the sample time is set, it should never have to be changed again. The cycle time may need to be adjusted based on the steaming rate and make-up water quality.

If in the sample/cycle mode, the conductivity does not rise to the setpoint, the cycle time is probably set for too short of a time and will need to be adjusted to a longer period of time. If the conductivity is always above the setpoint, the cycle time is probably set at too long of a time and will need to be adjusted to a shorter period of time.

The sample time is set in minutes and seconds and the cycle time is set in hours and minutes. Lakewood Instruments recommends that you consult your water treatment professional for more information on using these settings.

Ball Valve Delay
Motorized ball valves require a few seconds to open and close. If the valve is commanded to close before it completes the process of opening, it may enter a state where it is half-open. The ball valve delay feature prevents this from occurring. To use this feature, determine how many seconds it takes to open and close the valve. Use the longest time and round up 1 second. Use this value as your Ball valve delay time. This delay time will also be observed when manually operating the BLOWDOWN relay.

Recommended Delay Times

Valve	Delay Time
Solenoid	0 Seconds
Worcester Actuator	8 Seconds

6.5.1.2 Based on Volume

To program the blowdown to be based on volume, select "**2**" **BASED ON VOLUME** in the **BLOWDOWN RELAY** screen. The following screen will appear.

```
BASED ON VOLUME
===========
1 BLOWDOWN VOLUME
2 BALL VALVE DELAY
```

There are two methods available to blowdown based on volume, **TIME LIMITED** and **VOLUME LIMITED**.

With **TIME LIMITED,** the blowdown relay will be on for a specified amount of time after a specified amount of make-up has been received.

With **VOLUME LIMITED,** the blowdown relay will be on until a specified amount of blowdown is met.

After selecting **BLOWDOWN VOLUME**, another screen appears. This screen is the **HOW TO BLOWDOWN** screen. The two choices are: **1 TIME LIMITED** and **2 VOLUME LIMITED**.

If **TIME LIMITED** is selected:

- Select the water meter you want to base blowdown on by pressing "**1**" for **MTR1**, pressing "**2**" for **MTR2**, or pressing "**3**" for the sum of **BOTH** water meters.
- Use the keypad numbers to enter the proper water volume and press "**ENT**". You will automatically be moved down to the amount of time to blow down in minutes and seconds. Enter the amount of time to blowdown and press "**ENT**".

If **VOLUME LIMITED** is selected:

- The next screen that appears is **MAKEUP WATER METER?** Select the meter to which your makeup meter is wired and press "**ENT**".
- Use the keypad to enter the volume of makeup after which you want to blowdown then press "**ENT**"
- Input the volume of blowdown that you want to blow down then press "**ENT**".
- The next screen is the **EXCESS BLOWDOWN TIME ALARM** screen. Enter the amount of blowdown time before the **EXCESS BLOWDOWN TIME ALARM** will occur then press "**ENT**". **This alarm will close the blowdown valve** and it will give an alarm indication on the display. The alarm time is set in hours and minutes. To disable this feature, enter "**00:00**".

Ball Valve Delay
Refer to the previous section for an explanation on the Ball Valve Delay feature.

6.5.2 Configuring Relays 2,3,4

Below is the **RELAY OPTIONS** screen. The asterisk (*) next to one of the options tells you how that relay is configured to feed. Relays 2,3, and 4 can be programmed in each of the methods shown on the RELAY OPTIONS screen.

```
          RLY2
  ====================
1*DISABLED
2 SETPOINT
3 WATER METER
4 PERCENT BLOWDOWN
5 PERCENT OF TIME
6 FEED SCHEDULE
7 ALARM RELAY
8 SHORT CYCLE RESET
```

6.5.2.1 Disabled

Relays 2, 3, and 4 can be disabled. When a relay is disabled, it will not energize.

To disable a relay:

- From the **RELAY OPTIONS** screen press "**1**" **Disabled** to disable the relay.

6.5.2.2 By Setpoint

Relays 2, 3, and 4 can be configured to operate based on a setpoint. Refer to section 6.5.1.1 for a description of the setpoint and deadband.

When relays 2, 3, or 4 are configured for setpoint control, **the timeout alarm will shut off the relay when the timeout time expires.**

Setpoint Values

- From the **RELAY OPTIONS** screen press "**2**" **SETPOINT** to configure the relay as a setpoint relay. This will take you to the **BASED ON SETPOINT** screen.
- Press "**1**" **SETPOINT VALUES**. Use the keypad to enter the **SETPOINT**, press "**ENT**". Enter the **DEADBAND** value, press "**ENT**"**.** This will take you to the **TIMEOUT** screen.
- Enter a time for the **TIMEOUT** alarm. The **TIMEOUT** alarm will turn off the relay. Enter "**00:00**" to disable this feature.

When to Feed

- From the **BASED ON SETPOINT** screen press "**2**" **WHEN TO FEED**. **Select** "**1**" **ABOVE SETPOINT** or "**2**" **BELOW SETPOINT**. Refer to section 6.5.1.1 **WHEN TO BLOWDOWN** for a description of above setpoint and below setpoint.

6.5.2.3 By Water Meter

Relays 2, 3, and 4 can be configured to operate for a specified amount of time or for a specified amount of chemical through a flow checker based on a specified amount of flow through the water meter inputs. The flow total of MTR1, MTR2, or the sum of BOTH water meter inputs can activate the relay.

6.5.2.3.1 By Water Meter Without Flow Checker

To set up the relay to operate for a specified amount of time based on a specified amount of flow through the water meter inputs:

- From the **RELAY OPTIONS** screen press "**3**" **WATER METER**.
- Select either **MTR1** or **MTR2** or **BOTH** as the trigger for the relay.
- In the **FLOW CHECKER?** screen select **NONE**.
- Use the keypad to enter the amount of flow before the relay is activated. Press "**ENT**".
- Enter the amount of time that the relay will be activated. Press "**ENT**".

NOTE: If the digital inputs have not been set up as flow checkers the "FLOW CHECKER?" screen will not appear and that step will be skipped.

6.5.2.3.2 By Water Meter With Flow Checker

NOTE: At least one digital input must be configured as a flow checker before performing this programming step.

To set up the relay to operate for a specified amount of chemical, measured in milliliters with a flow checker, based on a specified amount of flow through the water meter inputs:

- From the **RELAY OPTIONS** screen press "**3**" **WATER METER**.
- Select either **MTR1** or **MTR2** or **BOTH** as the trigger for the relay.
- In the **FLOW CHECKER?** screen, select either **FLOW CHECKER 1 or FLOW CHECKER 2.**

```
FLOW CHECKER?
====================
1  FLOW CHECKER 1
2  FLOW CHECKER 2
3 * NONE
```

- Use the keypad to enter the amount of flow before the relay is activated. Press "**ENT**".
- Use the keypad to enter the amount of chemical to feed. Press "**ENT**".
- Enter the amount of time in minutes and seconds before the relay timeout alarm will be activated. Press "**ENT**".

NOTE: A time must be specified for the relay timeout. Inputting a zero for this time will cause the relay to shut off immediately. The purpose of the timeout alarm is to turn off the relay to prevent overfeeding of chemical.

6.5.2.4 By Percent of Blowdown Time

Relays 2, 3, and 4 can be activated by a percent of the time that the blowdown was on. The relay will activate after the blowdown shuts off. For example, if 50% is entered and the blowdown relay is on for 10 minutes, the relay will be energized for 5 minutes.

- From the **RELAY OPTIONS** screen, press "**4**" **PERCENT BLOWDOWN.**
- Use the keypad to enter a percent of blowdown time to activate this relay. Press "**ENT**".

6.5.2.5 By Percent of Time

The Percent of Time feature allows you to feed chemical strictly based by a percent of time. This relay control scheme works in patterns of 20-second time blocks. A relay is on for some multiple of 20 seconds and off for some multiple of 20 seconds. Below is a chart showing how Percent of Time works over a 400 second **example**.

x = 20 seconds on
- = 20 seconds off

	←==========400 seconds==========→
0%	- - - - - - - - - - - - - - - - - - - -
5%	x - - - - - - - - - - - - - - - - - - -
10%	x - - - - - - - - - x - - - - - - - - -
20%	x - - - - x - - - - x - - - - x - - - -
30%	x - - x - - x - - - x - - x - - x - - -
40%	x - x - - x - x - - x - x - - x - x - -
50%	x - x - x - x - x - x - x - x - x - x -
60%	x - x x - x - x x - x - x x - x - x x -
70%	x x - x x - x x x - x x - x x - x x x -
80%	x x x x - x x x x - x x x x - x x x x -
90%	x x x x x x x x x - x x x x x x x x x -
95%	x x x x x x x x x x x x x x x x x x x -
100%	x x x x x x x x x x x x x x x x x x x x

A 400-second example is shown because it will cover the patterns of the major percentages. The patterns for odd values such as 37% or 52% cannot be shown in a 400-second time interval but they would look very much like those patterns shown for 40% and 50% respectively. In an extreme case such as 99%, the relay would be on for 99 20-second blocks (1980 seconds) and then off for 1 20-second block (20 seconds) and then on for 1980 seconds and off for 20 seconds etc.

To determine the total amount of chemical fed over a 24 hour period, multiply the percent of time by the number of hours a day that your controller is operating, then multiply by your chemical pump flow rate per hour.

For example:

We select 10% of the time, our controller operates 24 hours a day and our chemical pump flow rate is 1 gallon per hour.

$$10\% \times \frac{24 \text{ hours}}{\text{Day}} \times \frac{1 \text{gallon}}{\text{Hour}} = \frac{2.4 \text{ Gallons}}{\text{Day}}$$

- From the **RELAY OPTIONS** screen press "**5**" **PERCENT OF TIME**.
- Use the keypad to enter the percentage of time desired. Press "**ENT**".

6.5.2.6 By Feed Schedule

The feed schedule is used to feed chemicals such as biocides on a time of day basis. Setting up the feed schedule is a two-part process. The first part is to configure the relay so that it will operate by feed schedule. The second part of the process is to configure the feed schedule. The feed schedule is covered in section 6.5.3.

- From the **RELAY OPTIONS** screen press "**6**" **FEED SCHEDULE**.

The controller will respond with the following screen.

The relay has been configured to operate based on a feed schedule but, the relay will not activate because the feed schedule has not been programmed yet.

6.5.2.7 As an Alarm Relay

Relays 2, 3, and 4 can be configured as alarm relays. Any alarm will cause the relay to activate. These alarms include: HIGH CONDUCTIVITY, LOW CONDUCTIVITY, OPENED TC, SHORTED TC, DRUM LEVEL #1, DRUM LEVEL #2, BLOWDOWN TIMEOUT, RELAY #2 TIMEOUT, RELAY #3 TIMEOUT, RELAY #4 TIMEOUT, and the NO FLOW alarm.

- From the **RELAY OPTIONS** screen press "**7**" **ALARM RELAY.** The controller will respond with the following screen.

NOTE: A relay that is configured as an alarm relay will be activated any time any alarm including the "NO FLOW" alarm is present.

6.5.2.8 Short Cycle Reset

When relays 2, 3, or 4 are configured to feed based on water meter with a flow checker there is a possibility that the water meter based feed cycle will be short cycled by receiving additional water meter inputs before completing the current chemical feed. When this occurs, the controller stops the current chemical feed and starts the next chemical feed. The controller will display an alarm message that a relay has been short cycled. This alarm message does not trigger the alarm LED or any alarm relays.

To reset a short cycle alarm, go to the relay options menu for the affected relay.

From the **RELAY OPTIONS** screen, press "**8**" **SHORT CYCLE RESET.** The controller will respond with the following screen.

```
RESET
COMPLETE
```

6.5.3 Setting up the Feed Schedule

Refer to section 6.5.2.6 to configure a relay to feed based on the feed schedule before continuing with this section.

To get to the feed schedule menu:

- From the **MAIN MENU** press "**3**" **FEED SCHEDULE**. You will see the following screen:

```
FEED SCHEDULE
============
1*BY WEEKDAY
2 BY CYCLE CALENDAR
3 LIST  SCHEDULE
```

The feed schedule can be programmed to feed chemicals by either **WEEKDAY** or by a **CYCLE CALENDAR** basis.

BY WEEKDAY is used to feed chemicals by the weekday name, i.e. Monday, Tuesday, Wednesday etc.. This is a seven-day schedule. At the end of the week, the schedule starts over again. To configure the feed schedule to feed by weekday:

- From the **FEED SCHEDULE** screen, press "**1**" **BY WEEKDAY.**

BY CYCLE CALENDAR is used to feed chemicals by a schedule other than one that is seven days long. **BY CYCLE CALENDAR** can be used to feed the same chemical every day or up to 28 days between feedings. The operator specifies the number of days in the cycle calendar. After the cycle calendar is completed, the schedule starts over again. This method of feeding is particularly useful when feeding two biocides on alternating weekly basis. To configure the feed schedule to feed by cycle calendar:

- From the **FEED SCHEDULE** screen, press "**2**" **BY CYCLE CALENDAR.**
- Use the keypad to enter the number of days in your cycle then press "**ENT**". Remember the maximum number of days allowed is 28.
- Use the keypad to enter which day today is in your cycle. E g. today is day number 5 in my 14 day cycle. Then press "**ENT**".

After selecting whether the feed schedule will be fed by **WEEKDAY** or by **CYCLE CALENDAR** it is time to actually program the schedule. To enter the actual feed schedule or to edit the feed schedule from the feed schedule screen above:

- Press "**3**" **LIST SCHEDULE**. This will take you to a list of all scheduled feeds as shown in the screen on the next page.

NOTE: The maximum number of scheduled feeds is 12 (twelve) total.
NOTE: ALL TIMES ARE IN HOURS AND MINUTES

FEED SCHEDULE			
==========			
1	01	03:00	RLY2
2	00	00:00	
3	00	00:00	
4	00	00:00	
5	00	00:00	
6	00	00:00	

- If there are no scheduled feeds, select the first schedule and press "**ENT**". If you are editing the schedule, select the schedule that you want to edit and press "**ENT**".

Below is an example screen for programming a chemical feed. Before programming a chemical feed, you need to configure Relay 2, 3, or 4 to be a feed schedule relay.

RELAY (ARROWS)	**: NONE**
CYCLE DAY	**: 0**
START TIME: 00:00	
COND SETPOINT	**: 0**
BLOW DURATION	**: 00:00**
FEED DURATION	**: 00:00**
LOCKOUT TIME	**: 00:00**
<UP><DOWN>ENT: ACCEPT	

- To program the schedule use the keypad to enter the values in the above screen. Press "**ENT**" to move to the next item.

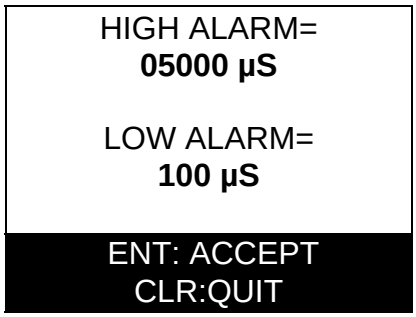
RELAY	is which relay you want to program (you must configure a relay to be a feed schedule relay first). Use the arrow keys to select the available relays.
CYCLE DAY or **DAY**	is the day you wish to actuate the feed schedule relay.
START TIME	is the time you want to start the feed schedule sequence.
COND SETPOINT	is a pre-bleed setpoint. This would typically be lower than the normal conductivity setpoint. Because the bleed valve will be disabled during a scheduled feed, a pre-bleed will help prevent a build up of tower conductivity. 0 μS will disable this feature. **This feature has no effect when conductivity is disabled**.
BLOW DURATION	if the COND SETPOINT is not met within this time, the blowdown will stop and the feed schedule relay will be actuated. **If conductivity is disabled, this is the amount of time the controller will blow down during the pre-bleed sequence.** Inputting 0:00 will disable this feature. Lakewood Instruments recommends that some time be entered if pre-bleed is used.
FEED DURATION	is the amount of time the feed schedule relay will be on.
LOCKOUT TIME	after the feed schedule relay is done, an additional lockout time for the **BLOW, 2, 3,** and **4** relays can be programmed. The lockout time prevents the other relays from operating until this time expires. Setting this time to 0:00 will disable this feature.

6.5.4 Alarms

The Model 1575e is equipped with both high and low conductivity alarms. This menu option allows you to program the specific values for these alarms. When a conductivity alarm is received, it will appear as a flashing message in the middle of the display and any configured alarm relays will be activated. Consult your water treatment specialist when determining the proper High and Low Alarm values for your system.

To get to the alarm settings:

- From the **MAIN MENU** press "**4**" **ALARMS**. Use the keypad to enter a value for the high alarm. Press "**ENT**".
- Use the keypad to enter a value for the low alarm and press "**ENT**".



NOTE: The high conductivity alarm will override the normal conductivity setpoint and force a blowdown.

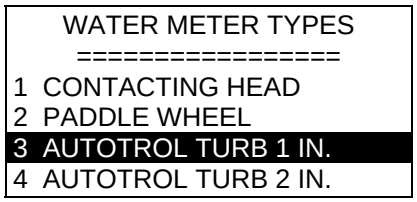
6.5.5 Water Meters

The 1575e series controllers will work directly with the following types of meters: dry contacting head meters, Seametrics open collector output meters, Signet 2535 and 2540 paddle wheel meters, and the Autotrol 1 inch and 2 inch meters. Contact Lakewood Instruments for other types of water meters.

Both water meter inputs are programmed in the same manner.

To configure the water meter inputs:

- From the **main menu**, press "**5**" **WATER METERS**. This will take you to the **WHICH WATER METER SCREEN.**
- Press "**1**" for **MTR1** or press "**2**" for **MTR2**.
- The water meters can be configured for gallons or liters. Press "**1**" for **GALLONS** or press "**2**" for **LITERS**.
- This will take you to the **WATER METER TYPES** screen as shown below.



- Use the keypad to select the type of water meter that you are using.

If **CONTACTING HEAD** is selected:

- You will be taken to the **GALLONS OR LITERS PER CONTACT** screen. Use the keypad to enter the number of gallons or liters per contact for your specific meter then press "**ENT**". You will then be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If **PADDLE WHEEL** is selected:

- You will be taken to the **K-FACTOR** screen. Use the keypad to enter the K-factor for your particular water meter then press "**ENT**". You will then be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If **AUTOTROL TURB 1 IN.** is selected**:**

- The controller will confirm that the **AUTOTROL TURB 1 IN.** has been selected and you will be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If the **AUTOTROL TURB 2 IN.** is selected:

- The controller will confirm that the **AUTOTROL TURB 2 IN.** has been selected and you will be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

6.5.6 4-20 mA IN/OUT

The model 1575e has one 4-20 mA output that is configured for the conductivity.

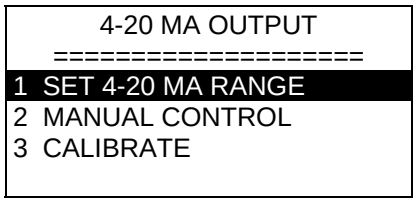
The model 1575e has a 4-20 mA input that is used for a remote conductivity input to the controller.

6.5.6.1 Set Up of the 4-20 mA Output

To set up the 4-20 mA output:

- From the **Main Menu**, press "**6**" **4-20 mA IN/OUT**.
- Press "**1**" **4-20 mA OUT SETUP**.

There are three things that can be done from the **4-20 mA Out Setup** screen; set the 4-20 mA range, take manual control of the 4-20 mA output and calibrate the 4-20 mA output. Below is the **4-20 mA Setup** screen.



Set the 4-20 mA Range

The 4-20 mA output range must be set for the output to be useful.

- From the **4-20 mA Setup** screen, press "**1**" **Set the 4-20 mA RANGE.**
- Use the keypad to enter a conductivity value for the 4-mA point. Press "**ENT**".
- Use the keypad to enter a conductivity value for the 20-mA point. Press "**ENT**".

Manual Control

Manual control is used to temporarily change the 4-20 mA output.

- From the **4-20 mA Setup** screen, press "**2**" **MANUAL CONTROL**.
- Use the up and down arrow keys to raise or lower the 4-20 mA output. To exit this screen press "**CLR**".

Calibrate

The 4-20 mA needs to be calibrated to the actual output to be accurate. A milliamp meter is necessary to calibrate the 4-20 mA output. Connect the milliamp meter in-line with one leg of the 4-20 mA output. Refer to the drawing in the back of this manual for wiring instructions.

- From the **4-20 mA Setup** screen, press "**3**" **CALIBRATE.**
- Use the keypad to enter the milliamp reading from the milliamp meter for the **4**-mA point. Press "**ENT**".
- Use the keypad to enter the milliamp reading from the milliamp meter for the **20**-mA point. Press "**ENT**".

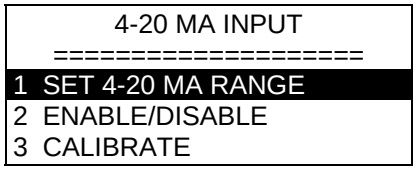
6.5.6.2 Set Up of the 4-20 mA Input

The 4-20 mA input is used for a remote conductivity application where the conductivity sensor will be mounted greater than 20 feet from the controller. An external 4-20 mA device is required. A Lakewood Instruments M100 series controller with a 35 card and an isolated analog signal conditioner works well for this application. Contact the factory for recommended analog signal conditioners.

To set up the 4-20 mA input:

- From the Main Menu press "**6**" **4-20 mA IN/OUT.**
- Press "**2**" **4-20 mA IN SETUP.**

There are three things that can be done from the **4-20 mA IN Setup** screen; set the 4-20 mA range, enable or disable the 4-20 mA input and calibrate the 4-20 mA input. Below is the **4-20 mA INPUT** setup screen:



Set the 4-20 mA Range

The 4-20 mA input range must be set to the 4-20 mA output range of the 4-20 mA device to be useful.

- From the **4-20 mA IN** setup screen, press "**1**" **Set 4-20 mA RANGE.**
- Use the keypad to enter a conductivity value for the 4-mA point. Press "**ENT**".
- Use the keypad to enter a conductivity value for the 20-mA point. Press "**ENT**".

Enable/disable

To use the 4-20 mA input, it must be enabled.

- From the **4-20 mA IN** setup screen, press "**2**" **ENABLE/DISABLE.**
- Press "**1**" to enable the 4-20 mA input or press "**2**" to disable the 4-20 mA input.

Calibrate

The 4-20 mA input needs to be calibrated to the actual input to be accurate. A milliamp meter is necessary to calibrate the 4-20 mA input. Connect the milliamp meter in-line with one leg of the 4-20 mA input. Refer to the drawing in the back of this manual for wiring instructions.

- From the **4-20 mA Setup** screen, press "**3**" **CALIBRATE.**
- Use the keypad to enter the milliamp reading from the milliamp meter. Press "**ENT**".

6.5.7 The System Setup Menu

The system setup menu is used to set up the cell constant, temperature compensation, anti-flashing, enable or disable the conductivity input, initialize the controller, change the security password, check the firmware version and check the diagnostics.

6.5.7.1 Process Parameters

The process parameters screen is used to set up the cell constant, temperature compensation, anti-flashing, and enable or disable the conductivity input.

6.5.7.1.1 Cell Constant

The conductivity sensor has a cell constant associated with it. The cell constant must be set up for the default conductivity value to be close to the actual conductivity.

To set up the cell constant:

- From the Main Menu press "**7**" **SYSTEM SETUP.**
- Press "**1**" **PROCESS PARAMETERS.**
- Press "**1**" **CELL CONSTANT.**
- Use the keypad to enter the cell constant for your conductivity sensor.

Below is a table of the Lakewood Instruments conductivity sensor cell constants that can be used with the model 1575e:

Table #1: Sensor Identification per Application

Application	Sensor P/N's	Description	Cell Constant	Temp Comp.
Cooling Tower	1167157	Sensor with 2 ft of cable	1.000	500 NTC
Cooling Tower	1167158	Sensor with 20 ft of cable	1.000	
Boiler (SR)	1168374	Sensor with 20 ft of cable	0.100	NONE
Condensate	1104591	540K.1-4-10I-10-TC500	0.100	500 NTC
Condensate	1168617	540K.1-4-10R-18-TC500	0.100	
Condensate	1104592	540K.01-4-10I-10-TC500	0.010	
Condensate	1169642	540K.01-4-10R-18-TC500	0.010	

6.5.7.1.2 Temperature Compensation

All Lakewood Instruments conductivity sensors are temperature compensated with the exception of the SR type boiler sensor. The temperature compensation for your sensor must be set in the model 1575e controller. Refer to the table above for the temperature compensation values for the Lakewood Instruments conductivity sensors.

To set up the temperature compensation:

- From the Main Menu press "**7**" **SYSTEM SETUP.**
- Press "**1**" **PROCESS PARAMETERS.**
- Press "**2**" **TEMP COMPENSATION**
- Press "**1**" for **500 NTC**. Press "**2**" for **NONE**.

6.5.7.1.3 Anti-flashing

The anti-flashing menu selection inserts a damping circuit value into the conductivity circuit to slow down the rate of change of the conductivity when steam flashing is occurring. The anti-flashing should only be used when the model 1575e is used with the boiler sensor in a hot sample application.

To set up the anti-flashing:

- From the **Main Menu** press "**7**" **SYSTEM SETUP**.
- Press "**1**" **PROCESS PARAMETERS**.
- Press "**3**" **ANTI-FLASHING**.
- Press "**1**" **YES** to enable anti-flashing, press "**2**" **NO** to disable anti-flashing.

6.5.7.1.4 Enable or Disable the Conductivity Input

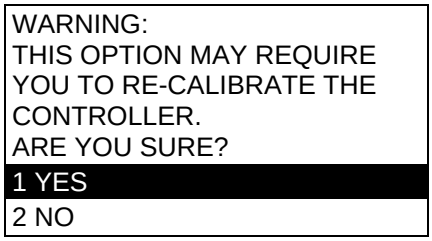
The Model 1575e can be used with or without the conductivity input. If conductivity is not being used, disable the conductivity input.

- From the **Main Menu** press "**7**" **SYSTEM SETUP**.
- Press "**1**" **PROCESS PARAMETERS**.
- Press "**4**" **ENABLE/DISABLE.**
- Press "**1**" **YES** to enable the conductivity input or press "**2**" **NO** to disable the conductivity input.

6.5.7.2 Initialization

Initialization restores the factory default settings to the controller. The whole controller can be initialized or just the calibration. It is suggested that you initialize the whole controller before you program the controller. This will clear any random settings that may be in the controller. To do so, follow these instructions:

- From the **Main Menu**, press "**7**" **SYSTEM SETUP**.
- Press "**2**" **INITIALIZATION**.
- Press "**2**" **WHOLE CONTROLLER** and press "**ENT**". A warning will appear on the screen (see below). Press "**1**" to proceed, "**2**" to cancel.



To initialize just the calibration:

- Press "**1**" **CALIBRATIONS** instead of "**2**" **WHOLE CONTROLLER** in the procedure above. The same warning screen will appear.

6.5.7.3 Change the Security Password

The security password can be changed from the factory default setting of 2222 to any four-digit value that you desire.

To change the security password:

- From the **Main Menu**, press "**7**" **SYSTEM SETUP**.
- Press "**3**" **SECURITY**.
- Use the keypad to enter the old password. If the password has not been changed before, the old password is **2222**.
- Use the keypad to enter the new password.
- Use the keypad to enter the new password a second time for verification

If you lose your password, contact Lakewood Instruments for assistance.

6.5.7.4 Firmware Version

Sometimes it is necessary to verify the firmware version of the controller for troubleshooting purposes. To get to the firmware version:

- From the **Main Menu**, press "**7**" **SYSTEM SETUP**.
- Press "**4**" **FIRMWARE VERSION**.
- The firmware version will be displayed along with a checksum value. The checksum value is used to verify that the program has not been corrupted. To exit this screen, press any key.

6.5.7.5 Diagnostics

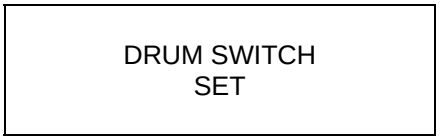
The diagnostics screen is used for troubleshooting purposes. Contact Lakewood Instruments for assistance.

6.5.7.6 Digital Inputs

The model 1575e has two digital inputs that can be used as either drum switches or as flow checkers.

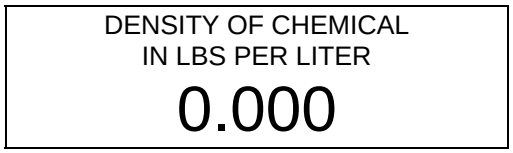
6.5.7.6.1 Digital Inputs Set As Drum Switch

- From the **Main Menu**, press "**7**" **SYSTEM SETUP**.
- Press "**6**" **DIGITAL INPUTS**.
- In the **DIGITAL INPUT SETUP** screen press "**1**" for **DIGITAL INPUT 1** or press "**2**" for **DIGITAL INPUT 2**.
- Press "**1**" to configure the input as a **DRUM SWITCH.** The controller will respond with the following screen.

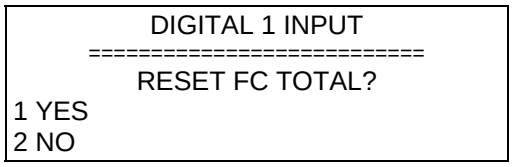


6.5.7.6.2 Digital Inputs Set As A Flow Checker

- From the **Main Menu**, press "**7**" **SYSTEM SETUP**.
- Press "**6**" **DIGITAL INPUTS**.
- In the **DIGITAL INPUT SETUP** screen press "**1**" for **DIGITAL INPUT 1** or press "**2**" for **DIGITAL INPUT 2**.
- Press "**2**" to configure the input as a **FLOW CHECKER.**
- Use the keypad to input the **DENSITY OF CHEMICAL IN LBS PER LITER.** Press "**ENT**".



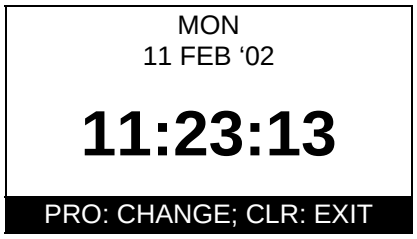
- In the **FLOW CHECKER RESET** screen press "**1**" **YES** to reset the flow checker total flow back to zero or press "**2**" **NO** to keep the flow checker flow total.



6.5.8 Setting the Clock

The clock uses the 24 hour or military time. 06:00:00 is 6 a.m. 18:00:00 is 6 p.m. To set the clock:

- From the **Main Menu** press "**8**" **CLOCK**. The following screen will appear:



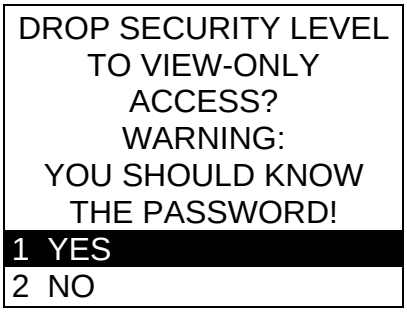
- Press "**PRO**" to change the clock settings.
- Use the up and down arrow keys to change the day of the week. Press "**ENT**".
- Use the number keys to change the date. Press "**ENT**".
- Use the arrow keys to change the month. Press "**ENT**".
- Use the number keys to change the year. Press "**ENT**".
- Use the number keys to change the hour. Press "**ENT**".
- Use the number keys to change the minutes. Press "**ENT**".
- Use the number keys to change the seconds. Press "**ENT**".
- Press "**CLR**" to exit this screen.

You must press "**ENT**" all the way through this menu for the settings to take affect.

6.5.9 Changing the Security Levels

The security level can be change to prevent any unwanted tampering of the controller. To change the security level from **Technician** to **View-Only**:

- From the **Main Menu**, press "**0**". *(Note that "**0"** does not appear on the menu screen.)*



- Select **YES** to change the security level.

The controller menu now functions at the VIEW-ONLY security level.
To return to the **Technician** security level:

- Press the numeric password from the **Process** screen:

Remember that following the first power-up the Technician password is 2222. You may change the passwords in the SYSTEM SETUP menu.

7.0 Maintenance

Periodic maintenance is required to ensure trouble free operation of the model 1575e controller. The following sections cover the required maintenance.

7.1 Sensor Maintenance

Routine maintenance is necessary in order to maximize the efficiency and accuracy of your sensor. Clean the electrode end of the conductivity sensor at least once per month. Cleaning of the conductivity sensor may need to be performed more frequently if it is in a high fouling environment.

- Remove power from the controller and shut off the sample flow.
- Remove the sensor from its plumbing.
- Use a wire brush to lightly brush the sensor tips. Do not use cloth to clean the sensor tips. Cloth has oils that will foul the sensor.
- If there is oil on the sensor tips, use isopropyl alcohol to clean the tips.
- If there is scale on the sensor tips use a 10% Muriatic or HCL acid to clean the sensor.
- Wash the sensor off with tap water.
- Install the sensor in its plumbing.
- Restore sample flow and check for leaks.
- Restore power to the controller.
- Perform a calibration of the conductivity.

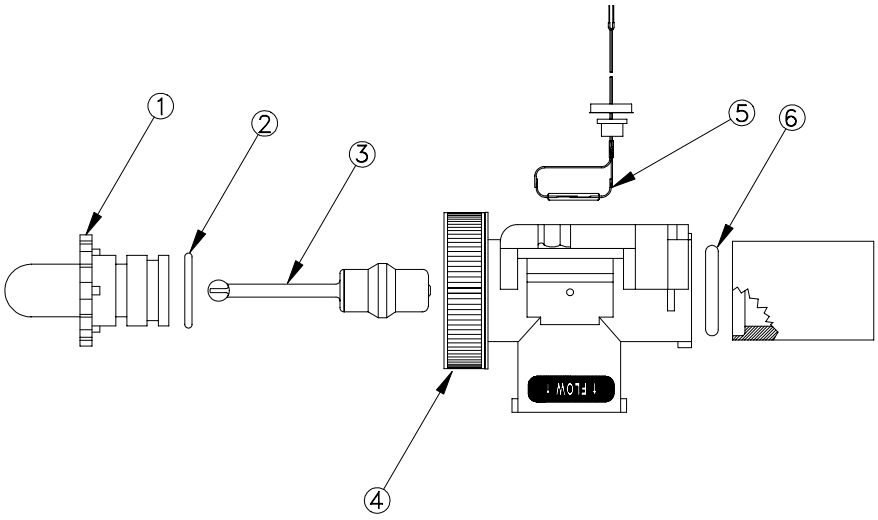
7.2 Flow Switch Maintenance

If you have the flow switch plumbing assembly, you may need to periodically clean the wetted parts in this assembly.

- Shut off the inlet flow and the power to the controller.
- Turn the red lock ring for the flow switch counterclockwise.
- Pull out the clear flowsight tube and remove the float with your fingers.
- Use a bottlebrush on the float, flowsight and the flow switch assembly to remove any residue.
- Clean and lubricate the “O” ring with a silicone-based lubricant (petroleum-based lubricants will cause the O-ring to swell).
- Lock down the red lock ring after you replace the components.
- Turn the inlet flow back on and check for leaks.

Replacing the Reed Switch
If you ever need to replace the reed switch for the flow switch, follow the procedure below.

- Remove the power to the controller and shut off the sample flow.
- Disconnect the flow switch wires from the controller.
- Remove the screws holding the flow switch plumbing assembly.
- Move the flow switch plumbing assembly away from the wall.
- Pull hard on the wires that go to the reed switch assembly to remove the reed switch.
- Push the new reed switch into the plumbing assembly and wire the new reed switch to the controller.
- Re-install plumbing.
- Restore flow to the plumbing assembly and check for leaks.
  Restore power to the controller.



FlowSwitchAssembly, P/N 67215

Find No.	Part No.	Part Description
1	1167266	Flowsight
2	1166418	O-Ring (flow sight)
3	1167234	Flow Magnet
4	1169740	Red Locking Ring Kit
5	1167235	Reed Switch
6	1166417	O-Ring (check valve)

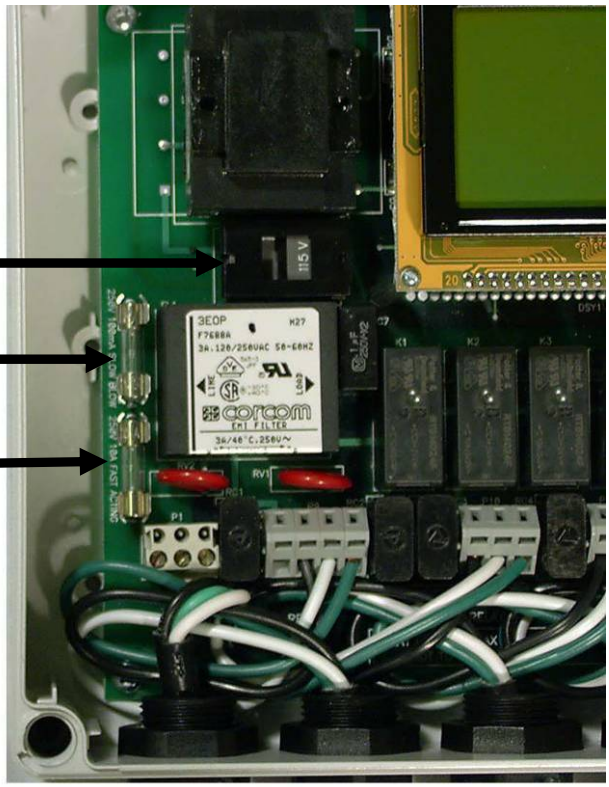
7.3 Replacing the Fuses

The Model 1575e contains a two 5 x 20 mm, European-style fuse. Replacement fuses must be a Schurter 0034.1526, Littlefuse 217.010, or equivalent 10A, 250V, fast blow type for Fuse F1 and a Littlefuse 218.100, Schurter 0034.3107, or equivalent 100mA, slow blow for Fuse F2. If a fuse is blown, the display will be blank when the unit is connected to power. Refer to the troubleshooting section of this manual for more information about blank displays.

115/230VAC power selector switch

100mA, 250V, slow blow fuse

10A, 250V, fast blow fuse



8.0 Troubleshooting

8.1 Error Messages

This section discusses some of the more common questions with the Model 1575e. These notes are not intended to be all-inclusive—only to cover the most common situations. If you have other questions or are need support, contact the Lakewood Instruments Technical Service Department toll free at (800) 228-0839.

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
{Alarm Flashing} "CONDUCTIVITY HIGH".	Conductivity is too high with respect to the high alarm setpoint. Also opens up Bleed Valve (useful during FEED SCHEDULE lockout).	1. See {BLOWDOWN TIMEOUT}. 2. Change the High Alarm Value.
{Alarm Flashing} "CONDUCTIVITY LOW".	Conductivity is too low with respect to the low alarm setpoint.	1. Check blowdown setpoint and deadband. 2. Verify blowdown valve is not stuck open. 3. Change the Low Alarm Value. 4. Insure the system is not overflowing.
Water meters not accumulating.	There may be a problem with the wiring or the reed switch in the meter may be bad. For water meters other than the contacting head type, check the manufacturer's user manual for that particular water meter.	1. Approximately 5 volts DC should be present at the input terminal when the water meter contact is closed. That should change to zero VDC when the contact opens. Check these voltages and for correct wiring. 2. Is the controller configured for your type of water meter?
{Alarm Flashing} "FEED SEQUENCE ACTIVE".	This simply indicates that a feed schedule relay is active.	No action necessary.
Display is blank.	There may be a problem with the incoming power, the fuses or the circuit board. Open the front panel to troubleshoot.	1. Check the fuse F1. Replace with 5 x 20 mm, 10A, 250V, fast blow fuse. 2. Check the fuse F2. Replace with 5 x 20 mm, 100mA, 250V, slow blow fuse. 3. Does the unit have power? 4. If there is power to terminals AC and ACC on P1, call Lakewood Instruments Technical Service for more information.
{Alarm Flashing} "NO FLOW" alarm.	Flow input switch is not closed.	1. The flow switch float may be stuck or no flow is present. 2. Flow switch may be bad. Replace reed switch in plumbing assembly. If no flow switch is used, a jumper wire should be installed across the flow switch input. Removing the jumper disables all relay outputs.

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
{Alarm Flashing} "BLOWDOWN TIMEOUT".	This indicates that the controller has been trying to reduce the conductivity for longer than the user-programmed time and is unable to reach the setpoint.	1. Verify operation of Blowdown valve system. Use the manual relay control to help. 2. Check that the blowdown valve is not stuck closed or restricted. 3. Verify operation of Makeup water system. 4. Verify blowdown timeout time is properly set for your application (see item #2 or RELAYS in MAIN menu).
{Alarm Flashing} "RELAY X TIME EXCEEDED"	This indicates that the controller has been trying to reach a setpoint or flow checker total for longer than the user-programmed time and is unable to reach the setpoint or flow checker total.	1. Verify operation of Blowdown valve system. Use the manual relay control to help. 2. Verify operation of Makeup water system. 3. Verify operation of chemical pump. 4. Verify operation of flow checker. 5. Adjust overfeed time for affected relay.
{Alarm Flashing} "OPENED TC".	Temperature compensator not being properly read.	1. Check wiring. 2. Replace conductivity sensor.
{Alarm Flashing} "SHORTED TC".	Temperature compensator not being properly read.	1. Check wiring. 2. Replace conductivity sensor.
{Alarm Flashing} "SHORT CYCLE RLY X".	A relay that has been configured to feed based on a flow checker has received a second trigger before completing the first feed.	1. Verify chemical pump is operating properly. 2. Verify flow checker is operating properly. 3. Increase speed or stroke of chemical pump. 4. Reset alarm as per section 6.5.2.8.
Motorized ball valve functions, but will not remain "open" or "closed" as expected.	The motorized ball valve is not indicating to the 1575e that it has actually reached the open or closed position.	Adjust the limit switch for the motorized ball valve.

9.0 Factory Service

☎ Technical Support for Lakewood Instruments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. - 5:00 p.m. CST.

NOTE: IF YOU CALL FOR TROUBLESHOOTING HELP, PLEASE HAVE THE MODEL NUMBER, SERIAL NUMBER, AND ANY OPTIONS PERTAINING TO YOUR UNIT AVAILABLE FOR REFERENCE.

✉ **Mail and returns should be sent to:**

Lakewood Instruments
7838 North Faulkner Road
Milwaukee, WI 53224 USA

When any merchandise is to be returned to the factory, please call and obtain a Return Goods Authorization (RGA) number and have the following information available:

- Customer's name, address, telephone and fax numbers (shipping and billing).
- A hard copy purchase order number for cases where repairs or parts are required that are not under warranty.
- A contact person's name and telephone number to call if the equipment is beyond repair or to discuss any other warranty matter.
- Equipment model and serial numbers.
- Reason for return, e.g., repair, warranty, incorrect part, etc.

We will then fax to your attention an RGA form that must accompany the returned item.

NOTE: THE RGA NUMBER MUST BE CLEARLY WRITTEN ON THE OUTSIDE OF THE PACKAGE(S) BEING RETURNED.

ANY ITEMS SENT BACK TO THE FACTORY WITHOUT AN RGA NUMBER WILL BE REFUSED AND RETURNED TO SENDER

Parts List and Service Guide

When calling Lakewood Instruments, please have your controller's complete model number and serial number available, together with the firmware version so that the Technician can better assist you.

Refer to the Ordering Information section of this manual for part numbered replacement parts.

Write your controller's complete model number, serial number, and firmware version here so that you will have them available if you wish to contact a Lakewood Instruments technician.

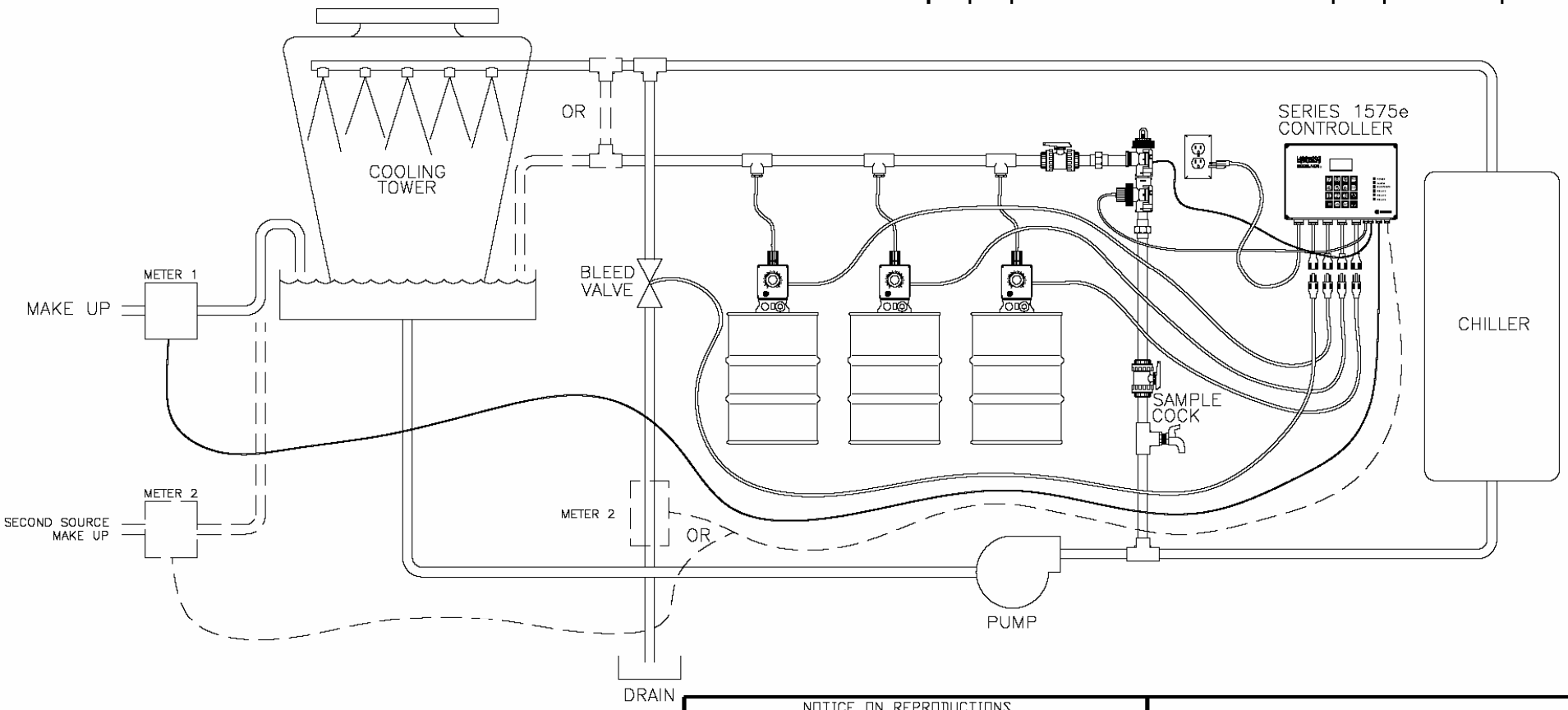
Model Number:

Serial Number:

Firmware Version:

10.0 Drawings

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/8/15/02	



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DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

MATERIAL: N/A

TOLERANCES UNLESS NOTED
DECIMALS: .X ± .XX ± .XXX ±
ANGLES ±
SURFACE

FINISH: N/A

DWN DGK DATE 8/15/02
CHKD DATE
APVD DATE
PART VERSION N/A

PROJECT: N/A
LIBRARY: N/A

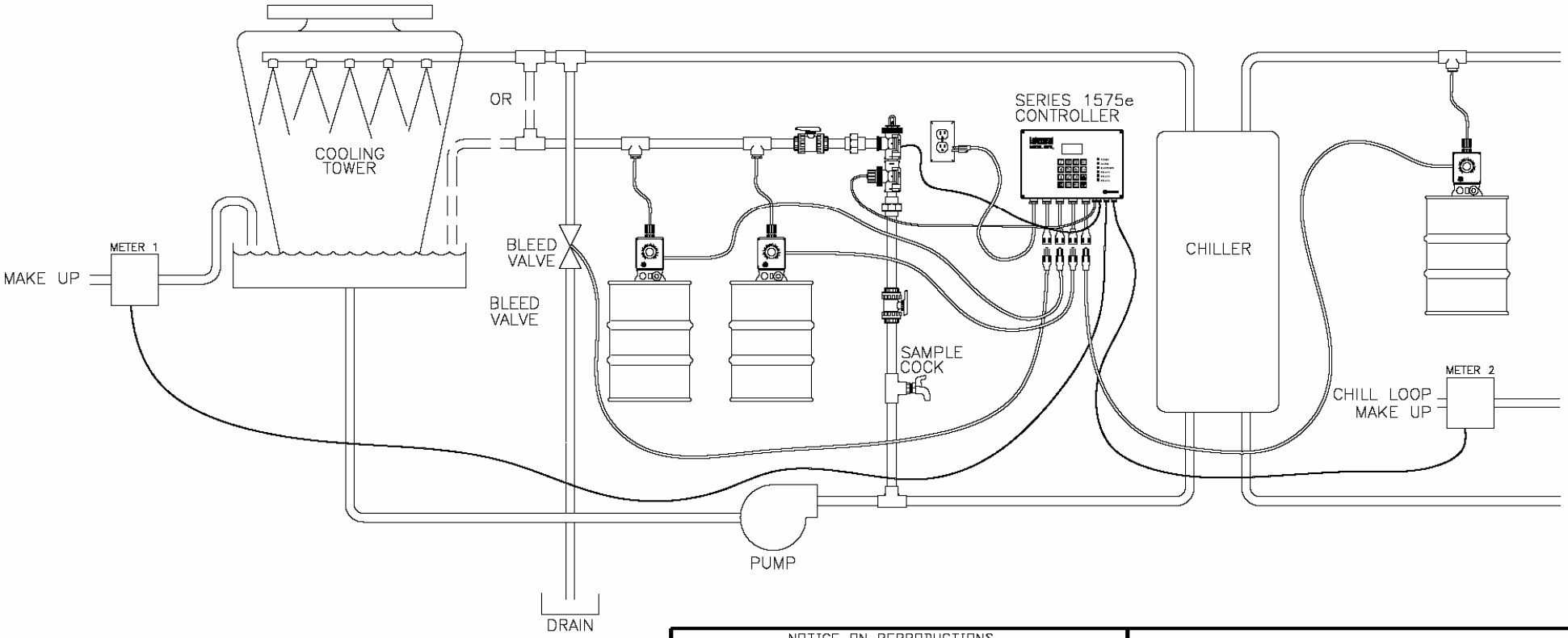
Lakewood INSTRUMENTS

TITLE
INSTALLATION DRAWING COOLING TOWER,1575e

SIZE		PN	REV
B	THIRD ANGLE	1229239	A
SCALE: NTS	SHEET: 1 OF 1	DWG NO: 1229239-1a	REV: A

P/N 1038130 REV B

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/8/15/02	



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DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

MATERIAL: N/A

TOLERANCES UNLESS NOTED
DECIMALS: .X ± .XX ± .XXX ±
ANGLES ±
SURFACE

FINISH: N/A

DWN DGK DATE 8/15/02
CHKD DATE
APVD DATE
PART VERSION N/A

PROJECT: N/A
LIBRARY: N/A

Lakewood INSTRUMENTS

TITLE
INSTALLATION DRAWING CHILL LOOP/COOLING TOWER, 1575e

SIZE		PN	REV
B	THIRD ANGLE	1229239	A
SCALE: NTS	SHEET: 1 OF 1	DWG NO: 1229239-2a	REV: A

P/N 1038130 REV B

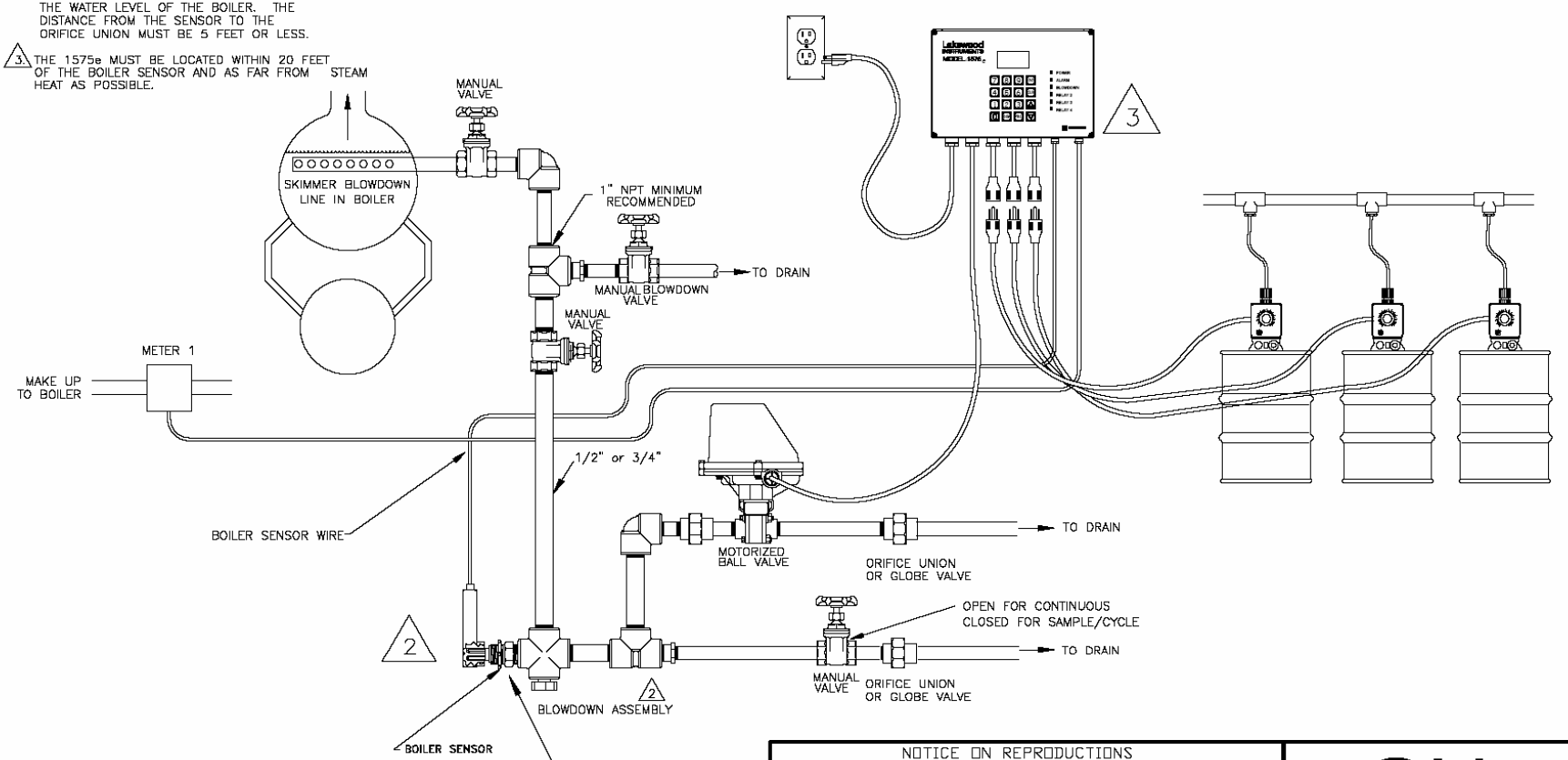
NOTES: UNLESS OTHERWISE SPECIFIED;

1. ORIFICE UNIONS MUST BE INSTALLED TO PREVENT STEAMFLASH. REFER TO USER MANUAL 1106840 FOR PROPER ORIFICE SIZING.

2. SENSOR MUST BE MOUNTED HORIZONTALLY AND MUST BE AT LEAST 2 FEET BELOW THE WATER LEVEL OF THE BOILER. THE DISTANCE FROM THE SENSOR TO THE ORIFICE UNION MUST BE 5 FEET OR LESS.

3. THE 1575e MUST BE LOCATED WITHIN 20 FEET OF THE BOILER SENSOR AND AS FAR FROM STEAM HEAT AS POSSIBLE.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/9/16/02	


STEAM
MANUAL VALVE
SKIMMER BLOWDOWN LINE IN BOILER
1" NPT MINIMUM RECOMMENDED
TO DRAIN
MANUAL BLOWDOWN VALVE
MANUAL VALVE
METER 1
MAKE UP TO BOILER
1/2" or 3/4"
BOILER SENSOR WIRE
MOTORIZED BALL VALVE
TO DRAIN
ORIFICE UNION OR GLOBE VALVE
OPEN FOR CONTINUOUS
CLOSED FOR SAMPLE/CYCLE
TO DRAIN
MANUAL VALVE
ORIFICE UNION OR GLOBE VALVE
BLOWDOWN ASSEMBLY
BOILER SENSOR
SENSOR MUST BE MOUNTED HORIZONTALLY AND MUST BE AT LEAST 2 FEET BELOW THE WATER LEVEL OF THE BOILER. THE DISTANCE FROM THE SENSOR TO THE ORIFICE UNION MUST BE 5 FEET OR LESS.

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DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

MATERIAL: N/A

TOLERANCES UNLESS NOTED
DECIMALS .X ± .XX ± .XXX ±
ANGLES ±
SURFACE

FINISH: N/A

DWN	DGK	DATE	9/16/02
CHKD		DATE	
APVD		DATE	
PART VERSION		N/A	

PROJECT: N/A
LIBRARY: N/A

Lakewood INSTRUMENTS

TITLE
INSTALLATION LAYOUT CONTINOUS OR SAMPLE/CYCLE, M-1575e

SIZE		PN	REV
B	THIRD ANGLE	1229239	A
SCALE NTS	SHEET 1 OF 1	DWG NO 1229239-3a	REV A

P/N 1038130 REV B

REVISION		REVISION HISTORY			
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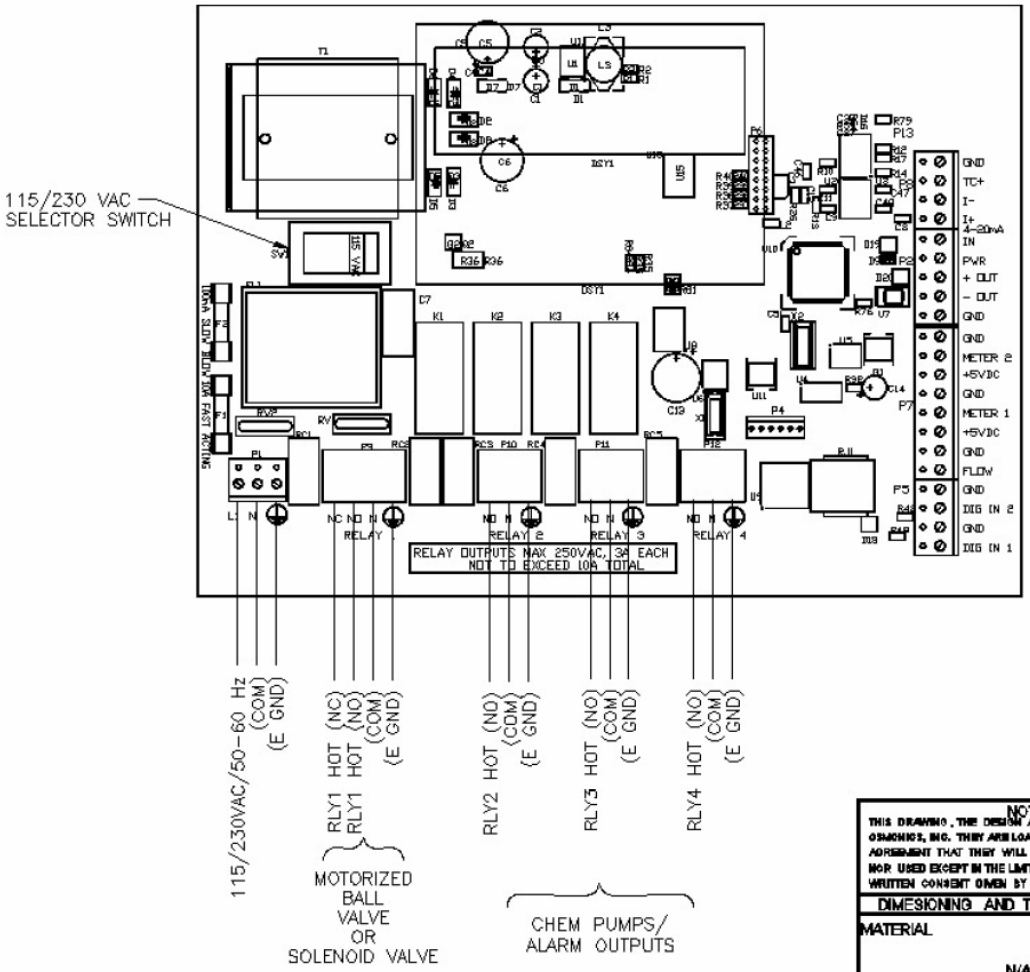
A	A	RELEASE	6377	DGK/23JAN02	



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DIMESIONING AND TOLERANCING PER ASME Y14.5M - 1994

MATERIAL: N/A

TOLERANCES UNLESS NOTED
DECIMALS: .X ± .XX ± .XXX ±
ANGLES ±
SURFACE

FINISH: N/A

DWN DGK DATE 23JAN02
CHKD DATE
APVD DATE
PART VERSION

PROJECT:
LIBRARY:

Lakewood INSTRUMENTS

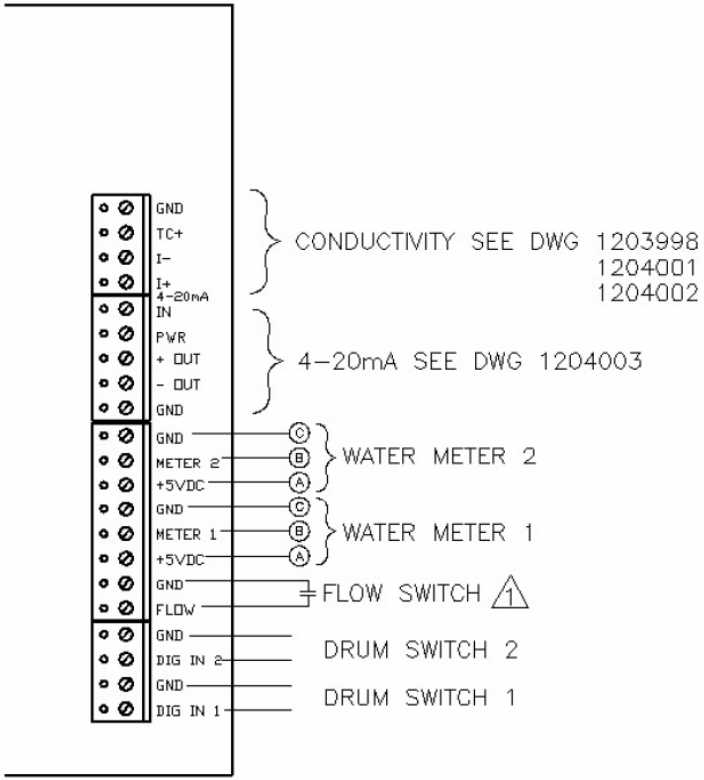
TITLE: WIRING DIAGRAM FOR THE 1575e POWER CONNECTIONS

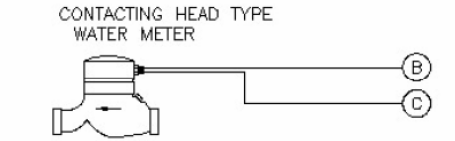
SIZE B THIRD ANGLE | PN 1229239 | REV A

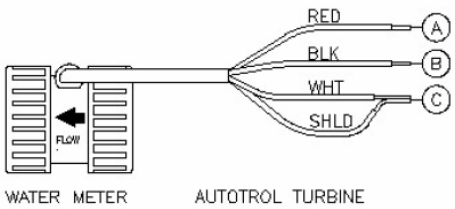
SCALE NTS | SHEET 1 OF 1 | DWG NO. 1229239-4a | REV A

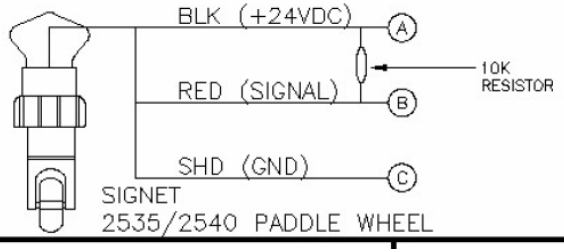
NOTES: UNLESS OTHERWISE SPECIFIED;
1. IF NO FLOW SWITCH IS USED, SHORT OUT PINS 1 & 2 WITH WIRE.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	









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DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994

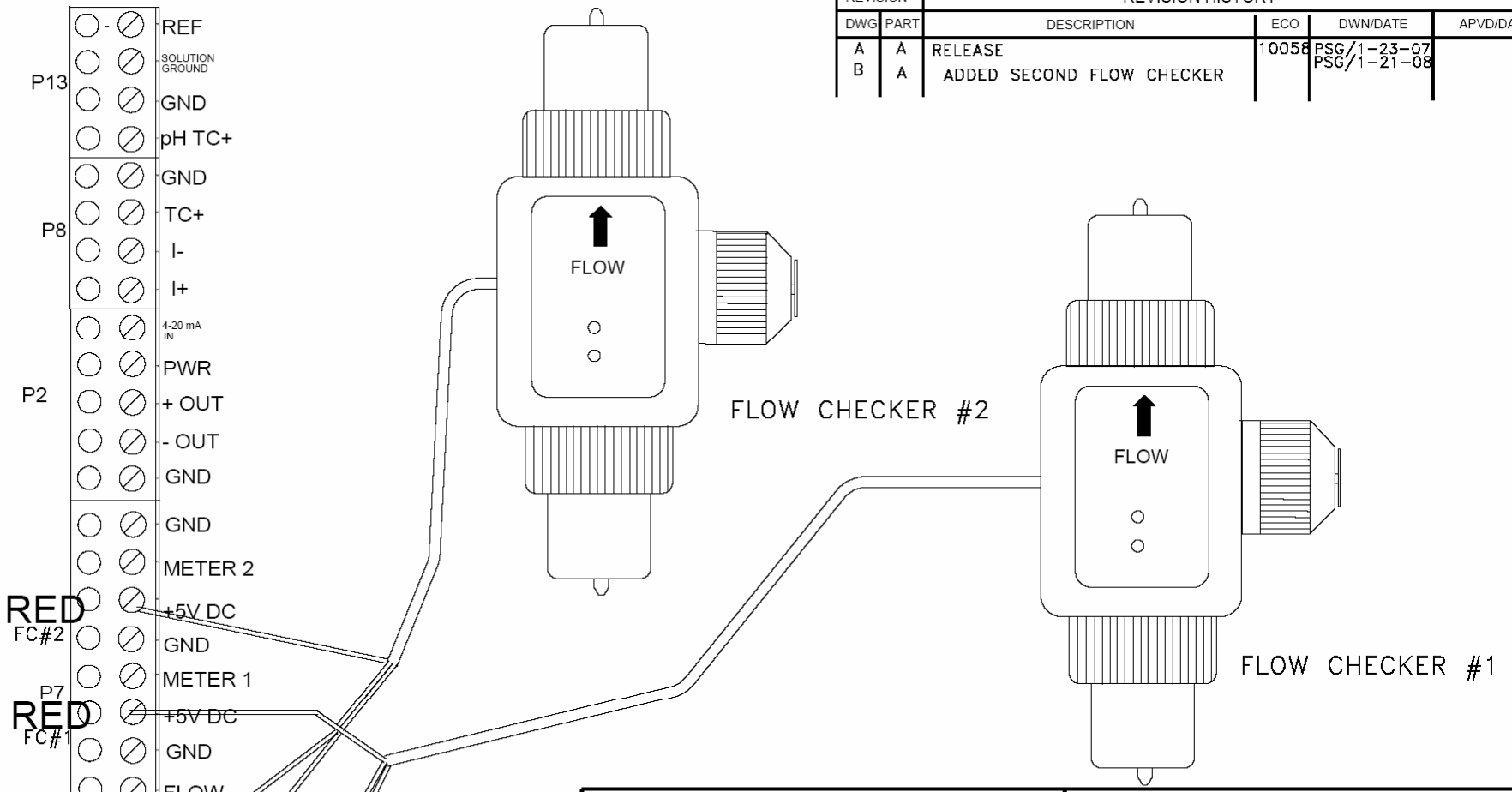
MATERIAL: N/A
TOLERANCES UNLESS NOTED: DECIMALS .X ±, .XX ±, .XXX ± ; ANGLES ±
FINISH: N/A
PROJECT:
LIBRARY:
DWN DGK DATE 23JAN02
CHKD DATE
APVD DATE
PART VERSION

Lakewood INSTRUMENTS

TITLE: WIRING DIAGRAM FOR WATER METER INPUTS ON THE 1575e

SIZE B | THIRD ANGLE | PN 1229239 | REV A
SCALE NTS | SHEET 1 OF 1 | DWG NO. 1229239-5a | REV A

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	10058	PSG/1-23-07	
B	A	ADDED SECOND FLOW CHECKER		PSG/1-21-08	



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DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

MATERIAL

TOLERANCES UNLESS NOTED
DECIMALS .X ± .XX ± .XXX ±
ANGLES ±
SURFACE

FINISH

DWN	PSG	DATE 1-23-07
CHKD		DATE
APVD		DATE

PROJECT:
LIBRARY:

Lakewood INSTRUMENTS

TITLE
WIRING DIAGRAM
FLOW CHECKER
1575e, HOH FEED VERIFICATION CTRL

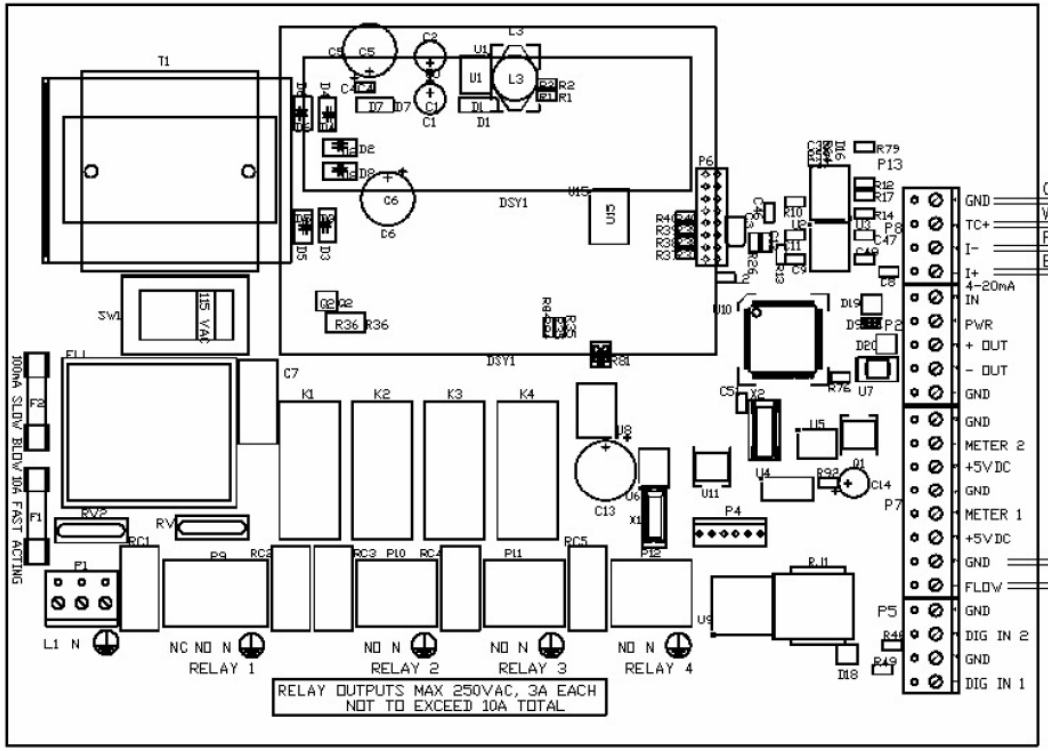
SIZE		PN	REV
B	THIRD ANGLE	1229239	A

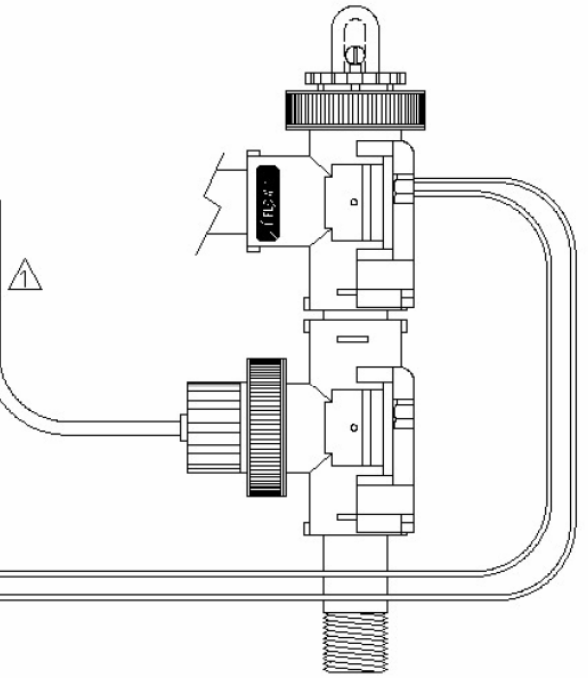
SCALE	SHEET	DWG NO	REV
NTS	1/1	1229239_10b	B

NOTES: UNLESS OTHERWISE SPECIFIED;

⚠1 MAXIMUM DISTANCE FROM SENSOR TO CONTROLLER IS 20 FEET.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	LRS/23JAN02





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DIMESIONING AND TOLERANCING PER ASME Y14.5M - 1994

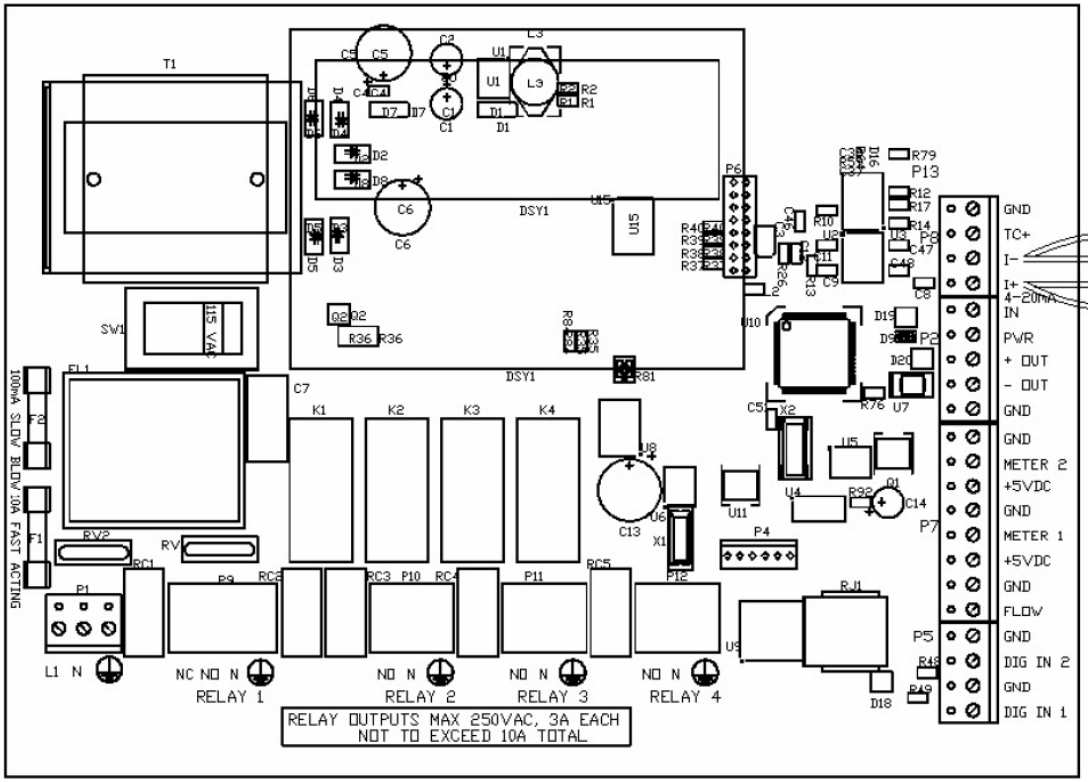
MATERIAL: N/A	TOLERANCES UNLESS NOTED: DECIMALS .X ± .XX ± .XXX ± ANGLES ± SURFACE			TITLE: COOLING TOWER SENOR WIRING FOR THE 1575e	
FINISH: N/A	DWN DGK	DATE 23JAN02		SIZE B THIRD ANGLE	PN 1229239 REV A
	CHKD PFP	DATE 23JAN02			
PROJECT:	APVD LRS	DATE 23JAN02		SCALE NTS	SHEET 1 OF 1
LIBRARY:	PART VERSION			DWG NO. 1229239-6a	REV A

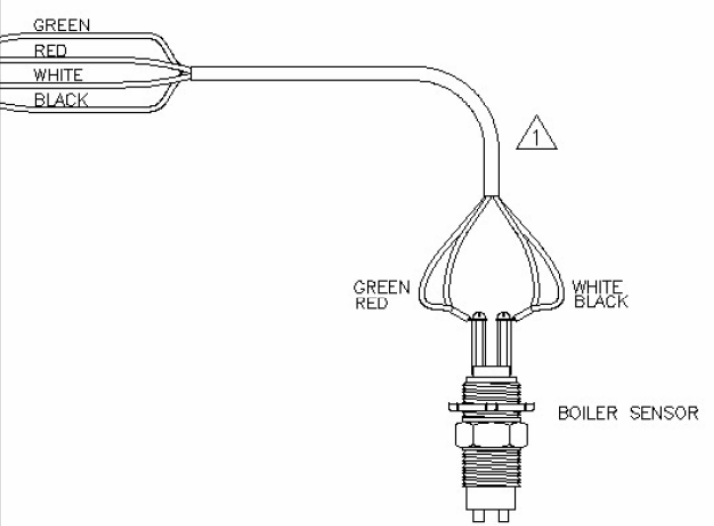
Lakewood INSTRUMENTS

NOTES: UNLESS OTHERWISE SPECIFIED;

1. MAXIMUM DISTANCE FROM SENSOR TO CONTROLLER IS 20 FEET.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	





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DIMESIONING AND TOLERANCING PER ASME Y14.5M - 1994

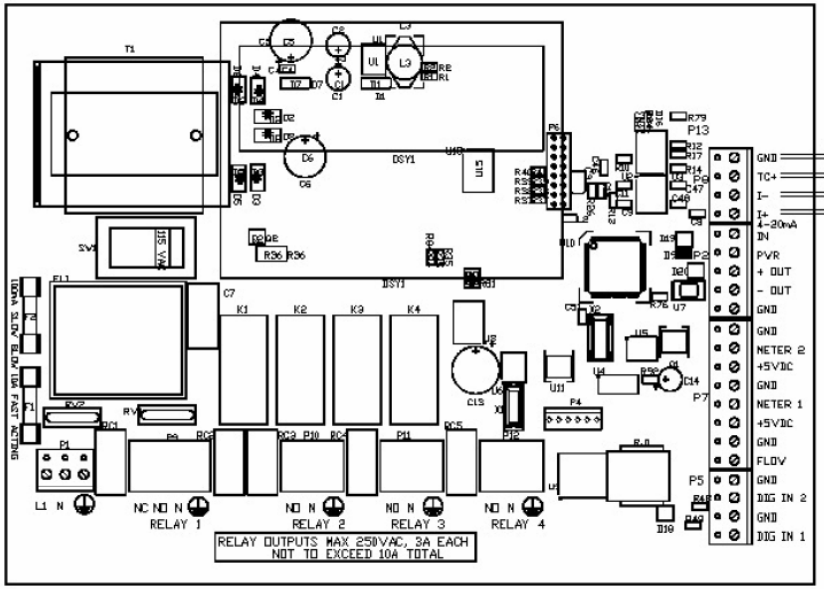
MATERIAL: N/A	TOLERANCES UNLESS NOTED: DECIMALS .X ± .XX ± .XXX ± ANGLES ± SURFACE		TITLE: BOILER SENOR WIRING FOR THE 1575e		
FINISH: N/A	DWN DGK	DATE 23JAN02	SIZE B	THIRD ANGLE	PN 1229239 REV A
PROJECT:	CHKD	DATE	SCALE NTS	SHEET 1 OF 1	DWG NO. 1229239-7a REV A
LIBRARY:	APVD	DATE			
	PART VERSION				

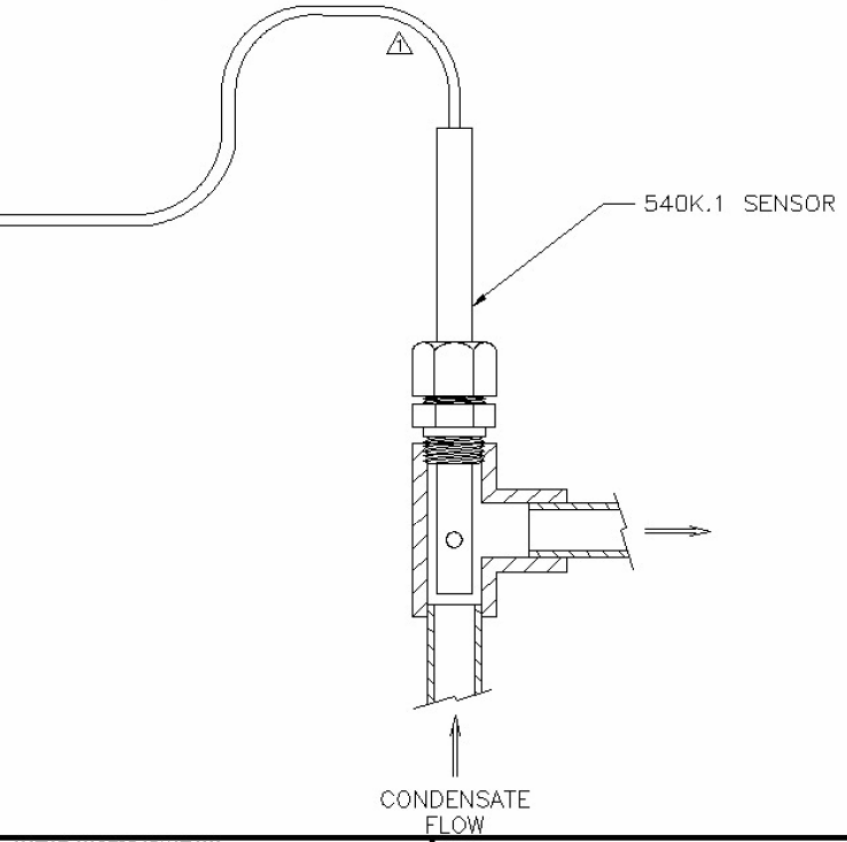
Lakewood INSTRUMENTS

NOTES: UNLESS OTHERWISE SPECIFIED;

⚠ MAXIMUM DISTANCE FROM SENSOR TO CONTROLLER IS 20 FEET.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	





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DIMESIONING AND TOLERANCING PER ASME Y14.5M - 1994

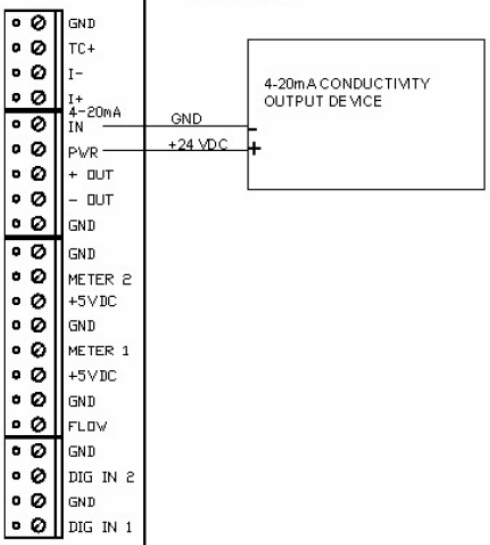
MATERIAL: N/A	TOLERANCES UNLESS NOTED: DECIMALS .X ± .XX ± .XXX ± ANGLES ± SURFACE		TITLE: 540K.1 SENSOR WIRING FOR THE 1575e		
FINISH: N/A	DWN: DGK	DATE: 23JAN02	SIZE: B	PN: 1229239	REV: A
PROJECT:	CHKD	DATE	THIRD ANGLE		
LIBRARY:	APVD	DATE	SCALE: NTS	DWG NO.: 1229239-8a	REV: A
	PART VERSION		SHEET: 1 OF 1		

Lakewood INSTRUMENTS

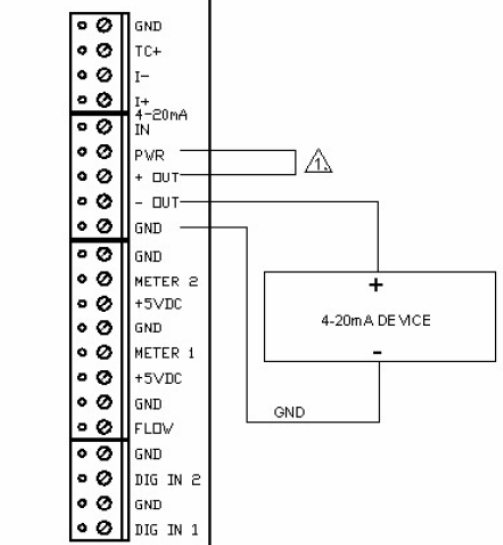
NOTES: UNLESS OTHERWISE SPECIFIED;
1. FOR INTERNAL 24VDC JUMPER WIRE IS REQUIRED.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	

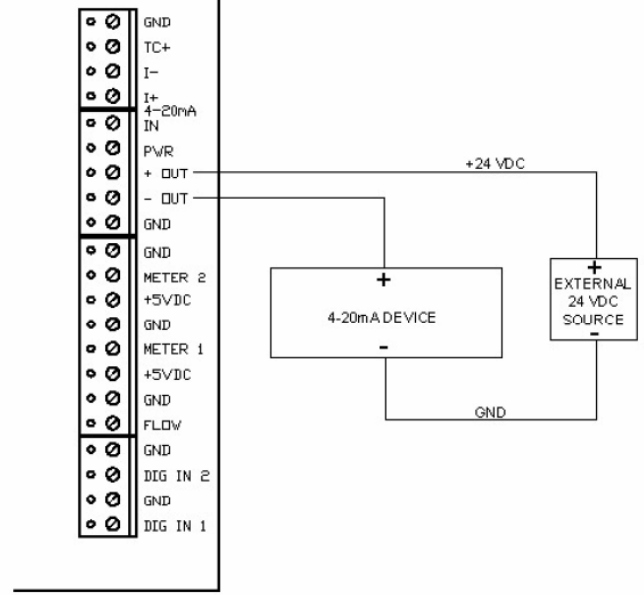
4-20mA INPUT FROM AN EXTERNAL 4-20mA CONDUCTIVITY DEVICE



NON-ISOLATED 4-20mA OUTPUT WITH INTERNAL 24VDC POWER SUPPLY



ISOLATED 4-20mA OUTPUT WITH EXTERNAL 24VDC POWER SUPPLY



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DIMESIONING AND TOLERANCING PER ASME Y14.5M - 1994

MATERIAL: N/A	TOLERANCES UNLESS NOTED: DECIMALS .X ± .XX ± .XXX ± ANGLES ± SURFACE		TITLE: 4-20mA WIRING FOR THE 1575e	
FINISH: N/A	DWN DGK	DATE 23JAN02	SIZE B	PN 1229239 REV A
PROJECT:	CHKD	DATE	THIRD ANGLE	
LIBRARY:	APVD	DATE	SCALE NTS	SHEET 1 OF 1
	PART VERSION		DWG NO. 1229239-9a	REV A

Lakewood INSTRUMENTS

For more information call toll free in the USA (800) 228-0839

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